THE AMERICAN GAS LIGHT JOURNAL

PUBLISHING OFFICE No. 42 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION, HEATING, MECHANICAL, CHEMICAL AND GENERAL SCIENCE.

VOLUME XCII., No. 19. Whole No. 1,822. | NEW YORK, MONDAY, MAY 9, 1910. | $3 PER ANNUM, IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. C. H. WADELTON, Manager. THOMAS J. CUNNINGHAM and ELBERT P. CALLENDER, Editors.

Published on each Monday of the year, at No. 42 Pine Street, New York City.

Telephone.—2906 John.

Terms of Subscription, Including Postage.—For the United States, $3; Canada, $4 per annum. European countries, $5 (£1—25 francs).

Remittances should be made either by post office order, express money order, registered letter, or bank draft on New York, payable to the order of A. M. Callender & Co.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND-CLASS MATTER.

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[OFFICIAL NOTICE.]

Third Annual Convention, Canadian Gas Association.

CANADIAN GAS ASSOCIATION,
OFFICE OF THE TREASURER,
WOODSTOCK, CANADA, April 19, 1910.

The Third Annual Convention of the Canadian Gas Association, and the first gas show ever held in Canada, will be held in Alexandria Rink, Hamilton, Ont., June 6th to 11th, inclusive. The Canadian Gas Association indorses to the fullest measure the exhibition.

Yours truly, A. W. MOORE, Secretary.

[OFFICIAL NOTICE.]

Southwestern Electrical and Gas Association.

SOUTHWESTERN ELECTRICAL AND GAS ASSOCIATION,
OFFICE OF SECRETARY,
DALLAS, TEX., Feb. 28, 1910.

The 6th annual convention of the Southwestern Electrical and Gas Association will be held in Beaumont, Tex., on May 12, 13 and 14, 1910. A feature of this meeting will be an exhibition of gas and electrical appliances and devices of all sorts. Elegant and roomy quarters for the display have been arranged for in the storeroom of the Kyle theater building. The matter is in charge of Messrs. M. T. Walker, Wm. Carroll, E. M. Weiss and J. C. Moss, Jr. The address of Mr. Wells, who is in charge of the renting of space, is Beaumont, Tex.

D. G. FISHER, Asst. Secretary.

[OFFICIAL NOTICE.]

Ninth Annual Meeting, Wisconsin Gas Association.

WISCONSIN GAS ASSOCIATION,
OFFICE OF THE SECRETARY,
MILWAUKEE, WIS., April 20, 1910.

To the Members of the Wisconsin Gas Association: Owing to the removal from the State, of Mr. H. H. Hyde, former Secretary and Treasurer of the Wisconsin Gas Association, the writer has been temporarily charged with the duties of this office.

The ninth annual meeting of the Association will be held in Milwaukee, May 11th and 12th, at which time Mr. Hyde's permanent successor will be choosen. Headquarters will be at the Hotel Pfister, and the meeting will be called to order at 9 A.M., of the 11th, by the President, Mr. R. B. Brown. Arrangements for the meeting are now in a fair state of completion, and the committee in charge feels that it can safely promise a profitable and enjoyable visit to all who will participate. Among the subjects that will come up for discussion are the following papers:

"Conversion of a Low Pressure Distribution System to a Medium High Pressure System at Beloit," by Mr. E. D. J. Dickey, Beloit.

"Water Heaters," by Mr. J. H. Walker, Milwaukee.

"Calorimetry," by Mr. J. B. Klumpp, Philadelphia.

"Prepayment Meters," by Mr. C. Luebkeman, Eau Claire.

"Advantages of Screening Coke," by Mr. Guy F. [illegible], Milwaukee.

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SMITHSONIAN DEPOSIT.

By way of entertainment of its members, the Association offers an informal beefsteak dinner, at the gymnasium of the Milwaukee Athletic Club, the distinctive features of which no doubt will appeal to all.

The gas men of Wisconsin have had more than their share of the hard and steady grind of business during the past year, due in a measure to the extra work caused by valuations and investigations through the Public Utilities Commission, wherefore, the members of the Wisconsin Gas Association owe it to themselves, as well as to the Association, to avail themselves of this splendid opportunity for relaxation, at the same time insuring a successful meeting.

Very truly yours, HENRY HARMAN, Acting Secretary.

[Official Notice.]

Fifth Annual Meeting, Natural Gas Association.

Natural Gas Association of America,
Office of the Secretary,
Delaware, O., April 19, 1910.

The Fifth Annual Meeting of the Natural Gas Association of America will be held in Oklahoma City, Okla., May 17, 18 and 19, under the direction of Mr. Wm. Hunter McKenzie. The Lee-Huckins Hotel has been selected as headquarters and every indication is for a successful meeting. The programme will be given later.

Yours truly, Thomas Clive Jones, Secretary.

BRIEFLY TOLD.

May Meeting, N. Y. Section Illuminating Engineering Society.—We are indebted to Mr. A. J. Marshall, the clever and insistent Secretary of the New York Section of the Illuminating Engineering Society, for the information that the next meeting of the Society will be held the evening (8:15) of the 12th inst., in the regular meeting hall, Engineering Societies Building, 29 West 39th street. The papers of the evening, as arranged for and as promised, are: "Illumination Tests," by Clayton H. Sharp, Ph.D., and Preston I. Millar, Gen. Sec.; "A High Efficiency Reflector for Street Lighting," by Clayton H. Sharp, Ph.D.; also, an "informal talk" on "Standards of Light," by Mr. Charles O. Bond, Manager of the Photometrical Division of the United Gas Improvement Company. The "High Efficiency" contribution will be actually demonstrated, and the actual results of recent experiments thereon will be shown under the aid of the stereopticon. "The Standards of Light" number will also be abetted by demonstrative aid. That there should be a good attendance of the rank-and-file goes without saying; for it is such attendance that will best repay the alertness of the officers of the Society whose activities have made certain an evening's entertainment of a high mental order.

CURRENT MENTION—

Bulletin No. 124, from the press of the Bristol Company, Waterbury, Conn., is of exceeding interest. It has mainly to do with the Company's device known as an "Atmospheric Recorder Thermometer," for recording outdoor atmospheric temperatures, the recording instrument being maintained indoors. Copies of this may be obtained by writing to the Company, at its Waterbury address.

The measure looking to increasing the salaries of the members of the Massachusetts Board of Gas and Electric Light Commissioners to $5,000 (the Chairman) and $4,500, respectively, will likely become a law. At any rate it passed the House by a vote of 111 to 79. In the hearings on the bill, the measure was opposed by Mr. O'Brien, of Boston, who urged that these salaries should be paid by the State rather than by the gas and electric lighting interests of the State. Perhaps that may be much the more equitable one; but, in the long run, it might be best to let well enough alone.

Mr. R. G. Stratton, Superintendent of Works, North Adams (Mass.) Gas Company, since 1897, resigned the position, the proprietors having decided to put both the gas and electric division of its service under the control of Mr. F. H. Briggs, electrician. On the evening preceding his retirement from active service he was presented by the men whom he formerly directed with a handsome gold watch (Howard type) and suitable fob. The case carries the inscription, "Presented to R. G. Stratton, by the employees of the North Adams Gas Company; April 30, 1910." The presentation was made by Mr. George Martin, and in a suitably expressed response Mr. Stratton acknowledged the faithfulness and steady work which his men had done for him as the Company's representative.

The Crosby House has been selected as headquarters for the meeting in Beaumont, Tex., next week, of the Southwestern Electrical and Gas Association.

Mr. E. C. Weisgerber, Secretary and Manager of the Zanesville (O.) Gas Light Company, recently caused the publication of this notice in the local papers: "We regret very much to inform you that, after Wednesday, June 1, at 12 o'clock, noon, we will discontinue the supply of artificial gas in Zanesville, and close down our entire plant. We will, therefore, ask you to kindly make other arrangements for light and fuel before that date. Our men will come and remove the meter and other property of the Company upon that date, or before, upon receipt of notice from you."

The new office building for the Springfield (Mass.) Gas Light Company, which is excellently located on West State street, that city, will be completed by August 1st. The structure covers a ground space of 82.6 feet by 62.6 feet by 30 feet in height, and is of water-struck brick, with limestone trimmings. It will be an addition to the notable buildings of the city and creditable alike to its owners and their architects—Messrs. Winslow, Bigelow & Wadsworth, of Boston.

Governor Draper, of Massachusetts, has appointed Mr. Alexander McGregor, brother of Capt. W. H. McGregor, of Pawtucket, R. I., a member of the Board of Trustees of the Soldiers' Home, in Chelsea. Is the Captain——but, perish the thought!

The Stacey Manufacturing Company is under contract to construct a storage holder for the Decatur (Ills.) Railway and Light Company.

The Board of Trade, of Louisville, Ky., is opposing the proposed merger of the gas and electric lighting interests of Louisville, Ky. Under this proposed merging the weak sisters in the old Louisville Gas Company are about to let in on equal terms the Kentucky Heating Company and one or two electric lighting concerns. Talk about the mess of potage! And how the head of the opposition herd must be lowing gently to the listening kine.

The Colorado Section of the National Commercial Gas Association was organized in Denver, the afternoon of April 20, the meeting being held in the offices of the Denver Gas and Electric Company. About 100 applications for membership were received, and the success of the branch is more than assured. It was also unanimously agreed upon to use every endeavor possible to have the National Association hold its meeting for 1911 in Denver.

We regret to be called upon to chronicle the death of Mr. James B. McGowan, General Manager of the Kansas-City (Mo.) Gas Company, and President of the Wyandotte (Kas.) Gas Company, who died in Kansas City the morning of April 25th. Heart disease was the ailment, and his death happened with scarce a moment's notice. He was born in Clay county, Mo., July 11, 1864, and has been connected with the gas industry of Kansas City for several years. We have in preparation a brief history of his business life.

Main Extension Notes.

By "C."

The greatest number of main extensions are made with the gas on, ... ess ure permitting testing as the main is laid, as well as expelling all air in the new sections. Very often it is not deemed best to shut off the gas on the section to be extended, on account of the inconvenience to the consumers thereon, and bagging is resorted to where practical. In laying wrought iron pipe, especially the smaller sizes, the ordinary foreman does not mind the pressure being on, priding himself on being expert enough to remove a plug and start the thread on a new piece "without anybody knowing it," and without losing an appreciable amount of gas. To all appearances this is true, but the deftest movement possible, in making the change from plug to pipe, must necessarily for an instant leave the live end wide open and affect the pressure of the entire system. The shock is sufficient to put out nearby burners so that the danger should prohibit this method; and the amount of gas lost varies with the pressure, in some instances being a noticeable quantity and a needless loss.

A handy way to overcome all danger of shocking the main system, when making live connections, is to procure a piece of sheet iron of appropriate weight and a little larger square than the diameter of the pipe coupling. Loosen the plug and crack it on the upper side sufficiently to start the sheet iron between it and the end of the coupling, push it down until it covers the full area of the coupling, replace the plug with the end of the pipe to be connected, remove the sheet iron and make up. Care must be used to avoid holding the movable parts against the sheet iron too tightly when inserting or removing it, as this is liable to throw them out of line and leave a more or less open end. When done carefully this method prevents any shock to the system and wastes but little gas. The idea may not be new, but it has been found very useful in numberless instances, an interesting one being where it was necessary to make a change in a 10-inch flanged fitting, which was on the only distributing main leading from the works and could not be shut off. It is needless to say that a case of this kind requires great care and quick work, or some one is liable to get dizzy.

Group Photograph, Pennsylvania Gas Association.

One of the pleasant features of the second meeting of the Pennsylvania Gas Association (and many pleasing ones there were) was the taking of "the features" of the members and their friends, as disposed suitably along and upon the handsome flight of steps leading to Heptasoph Hall, which was the well-equipped meeting place of the Association, and which is surely a credit to the public places of busy, bustling Easton.

In the photograph the officials are carrying their "numbers on their sleeves," and a revealing of the personality as per the numbering is as this:

Group Photograph of the Pennsylvania Gas Association taken on the Steps of Stoop to Heptasoph Hall.

No. 1.—Mr. J. H. Keppelman, President.
No. 2.—Mr. C. W. Butterworth, Vice-President.
No. 3.—Mr. H. H. Ganser, Second Vice-President.
No. 4.—Mr. E. G. Holzer, Past-President.
No. 5.—Mr. B. F. Cresson, Chairman Entertainment Committee.

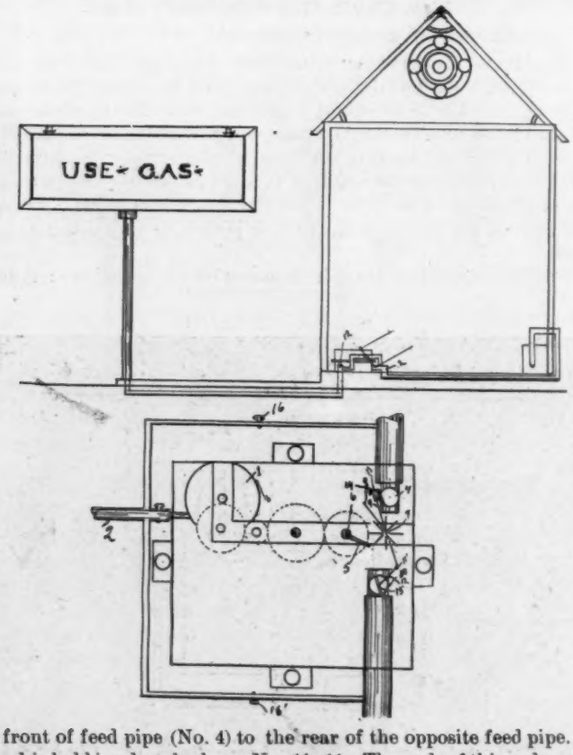
The success of the meeting, of course, resulted from the harmonious efforts of all; but the hardest worker in the list, whose successful attentions were unremitting, was the local host, Mr. B. F. Cresson, General Manager of the Easton Gas and Electric Company.

We wish herewith to acknowledge our obligations in this connection to Mr. C. W. Wardell, of the Gloucester division of the Welsbach Company.

The Davis Gas Flashlight Sign.

The idea of the inventor of the Davis flashlight sign was to get up a device for a gas flashlight sign that could be readily set on posts or to be extended over sidewalks, roadways, etc. The letters are cut out of aluminum or brass sheets, opalescent glass being set in behind them in such a way as to permit the light to readily show through the letters. A partition in the center of the sign causes one side to be illuminated while the other side is darkened, and *vice versa*. The advertisement on the sign is detachable, to permit an easy changing at any time.

The intermittent device and its operation are as follows: Referring to the illustrations, No. 1 shows the box, with small fan inclosed, made close so that no gas can pass through without operating the fan. No. 2 shows the inlet to fan box. The pressure of the gas being to one side of the fan causes it to revolve. The gas leaves the fan box through outlet in rear, shown at 3, and enters into feed pipe 4, which carries the supply to one side of the sign. While the gas is flowing the fan is revolving rapidly, the motion being reduced by means of cog wheels, which mesh with each other. No. 5 shows an arm extending from axle, at 6, each revolution of which takes up one tooth of cogwheel, No. 7. This cogwheel is made detachable in order that a wheel of larger or lesser number of teeth may be substituted, thus lengthening or shortening the time between flashes. No. 8 stands for an arm extending from lower end of axle, shown at 7, and this arm as it revolves operates the valve rod, No. 9. The latter extends from



the front of feed pipe (No. 4) to the rear of the opposite feed pipe. No. 10 rod is held in place by lugs, No. 11, 11. The ends of this rod are bent in such manner that when one end is vertical the other is horizontal marked Nos. 12 and 13. To these ends valve covers are attached, Nos. 14 and 15. When arm No. 8 comes in contact with the vertical end of valve rod No. 13, it causes same to drop, thus closing off feed of gas to that side of sign and at the same time causes the opposite end of valve rod to raise No. 13, which admits gas into feed No. 10, which feeds the other side of sign. From thence the operation continues to repeat itself. Nos. 16, 16 are adjustable pilots leading from supply pipe into feed pipes. The great field existing and waiting for a gas flash sign of any nature prompted the inventor to a study along the likely lines, with the result noted. This device is in operation in Houston, Tex., and continued trial has proven in every sense satisfactory and practical. Those desiring further particulars should communicate with the inventor, Mr. Robert E. Davis, 14 Crawford street, Houston.

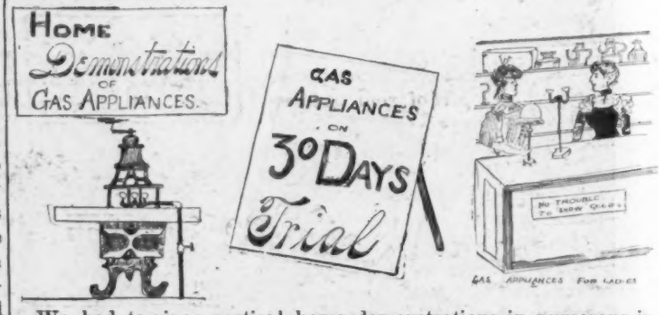
Buying a Gas Plant.—Chapter II.

By "R."

After having put the gas plant on its feet from a mechanical point of view, I proceeded to get some business. The ordinary run of gas consumption, by the consumers of gas in houses, stores and public buildings, was not of sufficient proportions to warrant the successful and profitable operation of the plant, and the fact that the output in money exceeded the income was quite evident. This could not go on for long; therefore I introduced schemes for increasing the profit of the plant, on practically the same lines that other managers of gas plants follow. These lines included three different departments of gas consumption, namely, the utilization of gas for common purposes in lighting residences, factories, offices, public buildings and stores, with improved illuminating apparatus in place of the ordinary lighting devices; second, the employment of improved gas illuminating apparatus for street service, public and private park work, boulevard lighting along automobile courses, lights for night work where night service is underway in the construction of great modern structures, on which 3 gangs of men are employed for constant service during the 3 divisions of 8 hours each out of the 24 hours of the full day; third, the increased employment of gas appliances for domestic purposes. It was in the latter division that I obtained the greatest and quickest results, although I knew the interior and exterior lighting divisions would of themselves develop.

I engaged men competent to handle these departments of the gas works, and the most modern and effective lamps were installed, wherever possible, in place of the common style of illuminants. I then undertook to making the home gas appliances a specialty. Upon visiting the homes of persons I discovered numerous instances of neglected gas devices for various purposes, such as cooking, hair-curling or other work, abandoned because of lack of skill in the operation of the same. I found good contrivances put aside due to the clogging of a burner, and there were contrivances in a disordered condition because of the lack of knowledge on the part of the user to turn a screw which had worked loose. There were fine mechanically designed appliances calculated to do good work, but which were prevented from doing so because of the clogging of a joint, the leaking of a union, or some minor defect. Furthermore, I found out there were many persons who did not know of the existence of many of the useful gas appliances for the housewife. In one home where I called they had had an explosion of an alcohol lamp, which was used to heat the water for the baby's meal, and I had no trouble in convincing the mother that she should use a gas heating device for this purpose, thereby avoiding the danger of vapor explosions. I had with me the various contrivances commonly used with gas in modern homes. I fitted up a carriage for carrying a stock of improved appliances and, with a boy to help, soon had many gas consuming devices in use in the homes. The consumption of gas increased right along. I had good success with the installation of gas heating ranges and parlor grates, to take the place of coal and wood fuel heating apparatus.

The home demonstrations with gas cooking ranges proved a winner for our works, for we succeeded in placing many of the stoves after having convinced the housewives of the safety, cleanliness and cheapness of the same. The lack of knowledge of some cooks concerning the use of gas cooking stoves was illustrated by one party, who told us that she did not want a gas range for cooking purposes because of the oil necessary to use, and she feared the oil would get on the foodstuffs.



We had to give practical home demonstrations in numerous instances in order to convince prospective purchasers. In the storeroom at the gas works I fitted up a special sales' department, with front plate glass towards the street side so that customers could view the interior of the place from the sidewalk. It was not long before patrons commenced entering the place to see demonstrations, and to buy goods in the gas heating, cooking and lighting line. I had two saleswomen there to show the ladies how to use hair-curling, gas heating fixtures and kindred inventions calculated for the home use of ladies. These ladies also gave practical demonstrations of the use of the individual coffee cup heating devices. Urns and utensils of the most up-to-date pattern, some of bronze and other heavy metal, were placed in position with the liquid contents, and the customers were shown how to heat the liquid to a boiling point by the use of the simple gas jet protruding through the walnut table top in the room where the lunch or other meal happened to be underway.

The ladies explained to the host or hostess the pleasure derived by the invited guests when the guests can witness the making of the coffee, tea or other material at the dining table. The liquids or foods thus prepared are always relished more by the guests, for an opportunity is given for the people about the table to discuss the various merits of a favorite coffee and means of preparing the same.

Furthermore, we permitted apparatus to go out on 30 days' trial. I lost some of the devices in this way, through dishonest persons, or persons who allowed the children to break the same; but the percentages of losses were very small as compared with the gains. We soon had the gas consumption largely increased, due to the installation of many more lights and thousands of devices in the homes using more or less gas every day and night. The business is now on a paying basis.

I am quite convinced that, if a gas company gets its men to work in any community with a view of giving the people actual home demonstrations with modern gas appliances, that company can greatly increase its business.

[Official Report—Continued from Page 855.]

SECOND ANNUAL CONVENTION, PENNSYLVANIA GAS ASSOCIATION.

Held in Heptasoph Hall, Easton, Pa., April 13-15, 1910.

First Day—Afternoon Session.

Discussion on the Thompson Paper.

Mr. Ganser—As I am booked to open the discussion on this paper, I wish to say that I was very much interested, for Mr. Thompson brings out some very good thoughts. In reference to "An active campaign for doubling our gas sales," I am afraid that many gas men are too easily satisfied. If they have succeeded in getting a gas range and gas water heater into the kitchen, they think they have done all there is to be done; of course it is understood that the house is piped and fixtured. A number of small appliances can be used in every kitchen, and if these appliances were placed there, and the user shown how they can be successfully used, they would become very popular with the latter. The bread toaster, iron heater and griddle cake iron are not very profitable from the actual sale; but, as far as the gas consumption is concerned, they are profitable. I am quite certain that if your consumers were systematically canvassed you would meet with much greater success than you now experience. We have taken people from outside our own particular business and had them sell these appliances on a very small commission. We have chosen women of middle age, and very often children, in this field, and have placed under this method very many appliances of the type I have mentioned, with very satisfactory results. In reference to the forming of an organization within the company, made up of the employees themselves. This is a very interesting subject, and I have made a number of efforts to form an organization of the character of which Mr. Thompson speaks, but without success. There is no doubt whatever that, if your employees could be brought together weekly or semi-weekly, and have a heart-to-heart talk, they are going to be more interested in your business, and that they are going to feel that they are a part of your business. I know a superintendent who attempted to form a club within his company and did not succeed; but he adopted a plan of going out on the job where the men were working. He took almost any subject that would give him an opening and talked with the mechanics to get them interested. I accompanied him one day, and it was amazing how interested the men immediately became. Of course, I will agree that this takes time away from installation work; but the time he took up that day did not amount to over 10 or 15 minutes. I tried the same plan myself several times, and the men seemed to be interested at once. There are a great many things concerning this subject about which I do not know, so I hope someone here will get into this club question to a greater extent than Mr. Thompson has treated it. He says this club is now engaged in discussing the rules compiled by Mr. Robb, and I imagine it will take some work to solve that proposition. I am familiar with it, and Mr. Robb is to be congratulated on his magnificent presentation, but it will take study to adopt those teachings to every working force. Another subject referred to here is the operating of ranges, water heaters, lights and gas appliances in general. We get our men together occasionally before they start out, and select a man to place a gas range in operation. It is surprising to see how little he knows about properly lighting a gas range, and particularly what he has to say about how to operate a gas water heater, and what he tells the consumer. Too much care cannot be taken in having a man thoroughly trained as to how he is to instruct the consumer. If left to his own reasoning, he is going to use his own judgment, which is sometimes bad. He is going to make statements that are entirely misleading, and that will eventually make the consumer have a grouch when the time arrives to pay the monthly gas bill. As Mr. Thompson says, you must have co-operation to have success, and you cannot have success without it. In reference to the employees having their hearts in their work. Almost all of you know that this is an important question. I don't believe it would make much difference how much energy you would put into the matter of trying to have the men put their heart in their work, for if you have one man who is a kicker and a grumbler he can do much towards disorganizing a whole force, and that man may continue his tactics for a long time before he is discovered. I certainly think Mr. Thompson is on the right track to dispel just this character of employee, for, at some one or other of the meetings, that man is going to make a statement by which he is going to show his hand. You will thereby have your cue to work on that man privately, and try to bring him around to the company's point of view in conducting it's business. It is absolutely necessary to have the confidence of the public if you are going to successfully conduct your business. It seems to be human nature to knock any corporation, particularly a gas company, or any company that is furnishing a commodity that does not leave some refuse behind it. If he can see the ashes from the coal he burns, he seems to think that he has had something for his money, but when he pays his gas bill, the thought very often strikes him that he hasn't had "All that was coming to him." I am going to tell you to teach your consumers to read their own meters. I sincerely hope that a bill will be introduced in the next legislature compelling the public schools to teach the pupils to read meters. Almost every home has a meter of some character, and why should children not be taught to read them? Then children in a few years would become consumers. They are taught weights and measures. They know what the grocer, the coal man and the butcher give them, and why shouldn't they know what the gas man gives them? Mr. Thompson says, "Always remember that big gas appliance sales and a ledger full of unpaid bills, which means hundreds of idle services, do not show on your reports as good business, but just the reverse." We also lose sight of the gas bill or the collection of it in our hurrying and endeavor to get new business. I know there are many men here who are practicing the very same plan, but you are apt, with the rushing of the season, to overlook your delinquents; and, gentlemen, this is a very serious matter. We send delinquent notices out 5 days after the last discount day. Five days later we have the meters removed unless some reasonable excuse is offered. If they name some definite day or date on which they will pay the bill, we always accept their promise, but we always expect them to keep their promise. We also collect many delinquent bills with the aid of a "P. P." meter set at $2 per 1,000 cubic feet, crediting the old account with the difference between the regular rate and $2. As a rule the people who are in the office of a gas company are very enthusiastic. Now if this enthusiasm could be spread among the consumers, it would do much towards creating a better feeling towards the company. On the last two discount days in each month (9th and 10th) we have a cake baking demonstration in our office. We bake as many cakes as we possibly can, and then hand them out to the people as they pass in and out. We find that this instills enthusiasm. The people stop and converse with one another and the company comes in for it's share of jokes; but we have a man there to explain things and take care of the company, and jolly them along, if jollying is going to do any good; but above all we are there to have the consumers understand why we do certain things that were not clear to them. I think the time has come, and I think it has been so with a great many gas companies for years, to have representatives for no other purpose than to inquire whether the service in every respect is satisfactory. Not to go there with the idea of selling goods, but simply to make inquiries whether the light service is as good as it should be; whether the gas range bakes all right; whether the gas water heater is making sufficient hot water in a given number of minutes; whether they are having any mantles that are carbonizing, and a thousand and one things that could be asked, that would tend to the betterment of the Company's position.

Mr. Frick—I think the point that appeals to me more than anything else is the thought brought out by Mr. Thompson as to increasing the sales on all existing appliances. It seems to me that that point cannot be too prominently fixed on the minds of our representatives, whether you call them "solicitors" or "boosters" or anything else. You all know it is a very simple proposition to go to a street where there has been no gas and take quite a number of orders for piping, etc., but in order to keep that business a certain amount of investment has to be made. We work all men on a point system, a range meaning so many points, a double oven so many points, etc. In doing that you can keep track of what your men are doing from day-to-day. You can stimulate their interest, keep a running record of just what they are doing, and find out just where every particular solicitor, booster or canvasser stands on any day in the month or year. By offering special inducements in the way of an increased number of points for picking up turn-ons or dead meters, you can develop that phase of the business without a great deal of trouble. As to meetings, it seems to me it is a very good thing where a large number of men are employed on the campaign work, but where there are only 3 or 4 men employed you can keep in close touch with those men from day-to-day and make meetings practically unnecessary. The men have to come in before it is time for them to stop for the day and report the various prospects, and that is the time to talk

over any new thing or encourage them along any prospect. Take it up with them right at the time when it is fresh in their minds and they will be much more interested than if you set a particular night for them to come to the office. When requested to come to the office they do it with the idea that it is more or less compulsory. They hold the same view that we had about going to school when about 14 years old. The idea was to get out of school as soon as possible, and if you could get out without retaining any knowledge it was so much to your benefit. Such is the attitude of most of the men at those meetings where they are brought back on their own time. We have tried it out and find the other plan works a great deal better. It is a better plan to put a half hour on this every day and talk over the standing of the different men, what they are doing, how their prospects are coming along, giving an encouraging word here and there when the thing is absolutely fresh in their minds. Another point brought up was the co-operation between the different departments. This we all very readily understand is absolutely necessary. There must be co-operation between the different departments. They must work together and hang together and be ready at any time to help each other out. At the same time, there must be a definite line drawn between the departments, otherwise one will try to dominate the other and the first thing you know the shop is trying to dictate to the new business department and the new business department to the shop, when and how things are to be done, and instead of co-operation you have exactly the reverse. In respect to personal solicitation, I had a peculiar example of that not very long ago. I have always advocated that is the very best method of reaching the people with any degree of success. Advertising is all right as far as it goes; but it doesn't go very far. It merely keeps your name before the public, and unless you are going to run a lot of Friday bargains, the people don't consider it to a very great extent unless one can afford extensive advertising. A man came to see me not very long ago soliciting "ads." The price he wanted was a good deal more than I thought we could pay in order to get returns in proportion to the expense, and I told him so.. I told him we always believed, and acted on our belief, that personal solicitation was better than advertising and that we spent most of our money in that direction. He said he didn't think that was so. I said, "If you are so convinced of that, why don't you advertise that you have space for sale in your magazine and let it go at that? Why do you come to see me personally?" He said he couldn't get business that way. I think that is a pretty good example as to how those things are worked out. The successful salesman will sell more appliances, and incidentally more gas, through the successful sales he has made than by actually coming into contact with those people. What I mean is that a satisfied consumer will make friends for that salesman, and that salesman will be remembered by that satisfied consumer to other prospective consumers. The plan we work on is that after a sale is made, the man who made the sale goes around to say something like this, "Well; has your gas range been connected, and if so, how is it working?" That is pretty much to the point and the salesman will very promptly be told whether or not it is working satisfactorily. If it is not working satisfactorily he makes it his business to see that that appliance is put in condition as soon as possible. The consumer sees that he is taking a personal interest in the sale, and on that account, when her next-door neighbor wants a range, this salesman will always be recommended as "The man who looked after my range; and you had better get him and then it will be fixed up all right." In that way the salesman can enlarge his field. I find that, among our salesmen who have been most successful, they all admit that is practically the way a large majority of their sales have been made. Simply because they have satisfied the consumer and have been advertised by that consumer. The point of bad sales has been brought up, but I have touched on it by saying we run on a point system, and any cancellations are taken off that man's points. When accounts are overdue and hard to collect, we consider them bad. A statement is turned over to the canvasser that a range which he sold has not been paid for, and since he made the sale he had better see the consumer. The canvasser feels and knows that, unless payment is made on the appliance, it will be removed by the company and cancellation entered against his points, wherefore it is to his advantage to keep that appliance in, and the outstanding accounts will not tend to run up on you. I don't agree with Mr. Thompson that it is a good idea to read reports on revenues. I think it is a very good plan to show your employees the way your send-out is coming along in the way of increase or decrease; but when it is a question of dollars and cents, I don't think it is a good idea to give them those figures. I don't know whether it is necessary to explain that or not, but I hardly think so. Mr. Ganser advances the idea of going around and talking to the men while they were on the various jobs and the apparent interest that they took in these little talks when the different appliances were explained. I think he would have found that there would have been equally as much interest if baseball was talked to them or the latest prize fight. It is simply a question of stopping work to listen. If you keep them in after quitting time I don't think you would get the same interest. It is a different proposition of doing it on their own time and on the company's time. As to the matter of co-operation and everybody pulling together, we are trying out a new scheme this year. That is, we have a baseball team. The positions on that team are open to anybody in the employ of the company. Games are played Saturday afternoons. We expect that in doing this and getting together on the common ground of sport, we will get closer to the men and know them a great deal better than we could in any other way.

Mr. Brock—Mr. Frick said advertising was a good thing as far as it went; but it didn't go far enough. There is a distinct and marked difference between advertising and publicity. You can get the latter easily. Advertising isn't worth anything without salesmanship, and salesmanship isn't worth anything without advertising; one isn't any good without the other. A sale takes place in the buyer's mind long before your salesman ever approaches that buyer. The consumer must have his mind made up for or against the appliance or the gas company. If the salesman approaches the prospect and the latter's mind is made up against the gas company, the salesman's task is doubled. On the contrary, if that prospect is favorably impressed, the salesman's task is a very easy one. Now it is up to you to impress the prospect favorably; and how can you do it? The next door neighbor may say a good word for the gas company, but at the same time she might say something against it. The only way to do it is through the medium of advertising. We needn't take a large space in a newspaper, but we must tell a story in there to create a desire in the mind of the prospect for what we are selling. Don't get the idea in your head that you can get along without advertising; because you can't. You have to have it. Another thing is, a gas company will send a salesman out from house to house and instruct him that, when any prospect doesn't purchase, to get the party's name and make a record of it. But this same company will let a woman or man come into the office to ask all about a gas range or other appliance and let her go out again without asking the name. If a person is interested enough to come and ask all about a gas range it is worth while to get the name.

Mr. Macbeth—One good point I want to bring up. On the bottom of page 3 Mr. Thompson says: "There is no other better commodity known to-day to do this cooking and lighting than gas." The whole proposition is almost entirely and solely a matter of salesmanship. A man is not and cannot be a good salesman unless he is thoroughly convinced that the merchandise he is selling is the best that can be brought out for the price. Mr. Thompson's paper rounds up in the last paragraph with plans we should lay out for the next season's work and there isn't anything about inside lighting in the whole paragraph. Unless the residence work is attended to you will lose it.

Mr. Keppleman—I believe I can tell you something that may be of interest on the subject of advertising. Our people are a very conservative class; they are frugal and saving, and do not take to new ideas readily. We have tried all sorts of canvassing methods to increase our business, but until the middle of February of this year never had a new business department, so called. We inaugurated a new business department at that time (February, 1910) consisting a chief and 5 solicitors. Simultaneously with the inauguration of of this department, we adopted and put into force the Philadelphia system of advertising. In fact, we use their advertising matter, changing it to suit our conditions; using all the daily papers three times weekly. Those of you who have seen the daily "ads.," as they appear in the Philadelphia papers, must have been struck with the originality of these articles. They certainly do appeal to the consumers of gas. This method of advertising, and the new business department working in combination, have proved very successful, in fact, so successful that I have been agreeably surprised at the results since we started this work. Prior to that time, on the old system, which meant spasmodic advertising and the same kind of soliciting, the results were anything but satisfactory. I am satisfied in my own mind now, that systematic newspaper advertising, if followed up by intelligent solicitation, is one of the best means of increasing the business.

Mr. Brown—I think the different points have been answered, but there are just two or three things I would like to mention. Mr. Frick raised the question of the wisdom of reading the revenue figures to the different employees of the department. I think his understanding of that word revenue and the way we use it is different. Mr. Thompson meant the profit on a given appliance. Some mention was made of a point system. We work our point system in this way: If an appliance is sold that uses $15 worth of gas a year we credit the representative with 15 points, a point for each $1 of revenue. What Mr. Thompson meant by revenue was the amount of gas we expect to sell through appliances we put out.

Mr. Keppelman—You talk about a point system. If a salesman gets a certain number of points, what does he get?

Mr. Brown—The arrangement we make is to base a man's value to the company on the number of points he is able to secure. A man should make a certain number of points to earn his salary. If he makes more than that, and is able to keep it up for 3 or 4 months consecutively, he is deserving of a raise.

Mr. Keppelman—What is your basis? What is the minimum number of points you want from a salesman which will entitle him to a certain salary per month?

Mr. Brown—This plan has been instituted on the idea they follow out in Philadelphia. They figure out a commission of 10 cents per $1. One dollar represents a point, so that a man, for instance, who would have 400 points in a month would have earned $40. If a representative makes a large number of points in excess of what he should, we give him more money.

Mr. Frick—Mr. President I think that the point system is generally figured on a basis of 10 cents a point, and it is found that the cost per point runs anywhere from 10 cents to 26 cents per point. In other words, some men are being paid on a basis of the number of points they earn divided into their monthly salary, which makes each point cost 26 cents. A man making 400 points will get $40 a month, or 10 cents per point.

Mr. Brown—At the end of the month we have figures to present to the representatives, among which are the cost per order and cost per $1 revenue. The cost per $1 revenue would be as Mr. Frick described, but we also try to show them what the other activities have cost.

On motion of Mr. Gillingham, seconded by Mr. Ganser, a vote of thanks was given Mr. Thompson and Mr. Brown.

Mr. W. H. Rhoades now read his paper entitled

PROFITABLE GAS ADVERTISING.

Our Committee on Topics for Discussion asked for a paper on profitable advertising. In making this request, I take it, they are asking for ideas, plans and experiences which, in our judgment, could be considered successful when measured by results obtained from their use as means for increasing sales of appliances, and more especially the sale of gas itself. If any ideas advanced or plans outlined may arouse discussion or fix some point of merit, this paper will not have been entirely without value.

Advertising in itself is an art; but profitable advertising is a science. Like every other science, it requires long study, experimenting and close observation of results in order to be able to develop it. Unfortunately it is not an exact science, for it has to deal with the ever-changing impulses and desires of human beings. The man who, by some seemingly superhuman power, can foresee and analyze these changes, is master of the situation.

In this period of hurry and keen competition, advertising has become a necessity to every form of business. The public must be informed thoroughly regarding the kind, quality and uses of the commodity offered for sale. The measure in which the business man is able to accomplish this work is largely a measure of his success. Good advertising is to-day the greatest factor in the business world. It is something more than a solicitor knocking at the door of our prospective customer; something greater than salesmanship; greater than the mental power of business organization. It is a positive creative force in business, a business builder, a developer of commercial possibilities. When it attains the power to develop human wants into intense desires, it leaves the plane of mere advertising and becomes profitable advertising, for it is at this precise stage that it increases the sales and expands the one column most watched—viz., profits.

It was formerly the province of the merchant to supply the normal needs of men. Now men do not know exactly what they need, and it is our business to truthfully tell them just why-and-how very much they need gas for fuel and light, and the many ways in which it can be used.

First of all, you must prove by fact and demonstration that it is the best fuel and light; that it stands first in point of economy, saves labor, time and energy, and gives comfort and pleasure to the entire household.

The public must also be thoroughly informed in regard to the many appliances by means of which it may be used; how they are used; their convenience, reliability and results that may be obtained. In other words, you must fix it firmly in the public mind that they need just what you have and that you have the best commodity of its kind known for their use, and the best form of all appliances for its use. Your advertising copy should convey this knowledge by stating clear, concise facts—argumentative in style—or facts with attractive illustrations. Such advertising will win confidence best and carry your influence farther than any other form. We must remember that each advertisement is a salesman, multiplying our active corps by hundreds. You select your solicitors because of their efficiency, and closely check the returns of their work. Just as much, or even more, care should be given to the selection of advertising copy, both in substance and appearance, for it is working on its merits just as much as the solicitor.

This corps of hundreds of silent salesmen, through the medium of the newspaper or booklet, are working night and day to prepare the way for the regular solicitor to close the order; or, better still, is sending the customer directly to your desk. If ads. are of such a character they are earning profits and are not dead expense.

So much for the fundamental principles of profitable advertising. What about form? Form will vary with different kinds of business and must be planned to suit each one. The department store may need ½ page to bring the subject of various bargains quickly and strikingly before the public. The automobile manufacturer will, from necessity, need an attractive ad., stating the most striking facts regarding his car, set neatly but convincingly before his prospects. The banker needs most a conservative statement of financial standing and line of work he is capable of handling. Each is different in style and copy, consequently attracts and holds the attention of different classes, but at the same time is noticed and in a way attracts attention of the entire pubic.

Good gas advertising must have the blended style of each of the above mentioned forms—the attractiveness of the auto ad., the conservative statement of facts of the banker, and still in a forceful manner bring before the public the real bargain of quality which you wish to present. This paper presupposes that in all communities where gas is used the excellency of service, quality of product, and a desire to give value received in every way, have been thoroughly impressed upon the mind of the public. If this attitude has been backed up, the community will be ready to read carefully and with consideration the ads. or advertising talks which are continually being sent out to keep them in touch with you and you with them. You will notice I have used the word continually. I firmly believe that results from advertising are had only from regular and persistent use. What are some of the requisites? In the first place have good goods to push. This means in every line; good lamps, good stoves, good fixtures and good gas. Having these you can give facts without contradiction and tell how best results can be obtained and why. Let us look at the subject by seasons. We advertise our line of lamps of all kinds and fixtures from late fall throughout the winter months. These ads. state facts regarding quality of goods, low cost, economy of use, quality of light obtained, and effect of various light sources on the eye. It may be a slight reduction in installation price is occasionally featured, but care is taken to make this of short duration and a return to original prices a certainty. These ads. are made attractive by using cuts showing the actual fixtures or lamp with pleasing surroundings. By this means the attention is caught and thoughts started along lines of comparison with actual conditions along similar lines where the ad. is being read.

The wording of such ads. should be so arranged that the main feature is as distinct and clear as the cut. Have both as near the same line of vision as possible, and still maintain form and symmetry. Quality and use are brought out and results particularly emphasized. Interspersed with these ads. we feature our best ranges, water heaters, furnace connections and appliances. This season gives greatest advantage for window advertising, Artistic window arrangement of goods pushed by our ads. draws the attention of the passing public and actual use of the appliance is demonstrated. Prices plainly readable are attached, so that as much real canvassing is being done

silently outside of the salesroom as is quietly being pushed inside the salesroom.

Spring brings the ads. for house piping. Why more especially at this season? Because the homes are torn up and the work can be done more conveniently. Special stress is laid on the point that quick response can be given orders of this kind before the rush of work at time of moving and installing of ranges for the summer. Here also come the opening ads. for the sale of ranges, water heaters, etc. Although during the winter we have continually told the public how much they need the all-year-round gas kitchen with accompanying furnace connections, we greet them, before the last snows of winter have disappeared, with a description of the line of ranges for the coming year. They are informed as to what the latest and best in this line will be. Improvements that are sure to please are given, and above all we urge that their order be placed as early as possible in order that they may avoid the rush of April, May, June, July, August and September. And rush it is; so much of a rush last year that, in spite of increased help and everything possible done to facilitate handling of orders, we were not within a week of our orders until August, and June found us as far back as 10 days to 2 weeks.

One inducement given during April was a toaster and sad-iron heater given free with each range bought during that month. Another in March was free connection with 6 feet of pipe for one light in kitchen if the lamp were purchased with a range. This not only helped to sell ranges but lights as well, and assisted in many complete house piping installations. The copy of our range ads. varies. Sometimes it is a list of reasons why a range should be in every home. Again, it pictures the cost and comfort with which the canning and summer work can be done as compared with the discomfort of a red hot coal stove, appropriate cuts being used to demonstrate the text.

As the cooler weather comes we call attention to the waste of energy, time and money by keeping both the kitchen coal fire and furnace going. Why not save the heat energy escaping to the flue of the furnace by installing a water back in the furnace to connect with the circulating tank in the kitchen, thus insuring a constant supply of hot water. Also heat the kitchen by putting in a radiator on this line. This will save of the kitchen coal fire. With this connection a gas range for use during the entire year will save labor and economize by reducing the yearly cost for coal.

Again, the long lighting hours have come. At this time reading lamps, house piping and fixtures are again our features. Do not think from what has been outlined that the public can tell the time of year exactly by watching the gas company ads., not quite; but they would not be very far wrong, for their troubles of various seasons need our remedies, and certainly good business requires that these troubles be anticipated and help given as far as we are able. Yes, further than that, we insist that they need these various forms of economic relief; that these are necessities and not luxuries. Finally the people see that we are right and either come for help or accept our proposition when we call to see them. So much for newspaper and special ads.

We have tried a few novelty features. The best and almost omnipresent ad. is a fly net, one for about every five teams in your community. They carry the news, "Keep cool and use gas. Cheapest, coolest and cleanest fuel. Best, softest and whitest light." "Use gas." In and out among the shoppers, past the homes, here, there and everywhere, always to be seen, always talking, persistent and telling. These ads. will make an impression by constant reminding—until investigation proves the truth of the assertion and customers come from all walks of life.

We have but recently distributed pamphlets showing the gradual development of means of lighting, from the earliest times to the present, ending, of course, with a form of the latest improved inverted light. The reading matter was highly instructive and interesting. Print, illustrations and decorating of the best form. These were distributed by our meter readers at little or no expense. Just what results will come from this work cannot be stated, but, judging from indications, we think it to have been well worth the effort, for more inverted lamps are being sold and people are talking more generally and favorably concerning their use.

Our gas bills carry some form of ad. each month, and we think it has been quite profitable. They are read and have the advantage of being observed while the customer is in the office. They should carry copy referring to lines of appliance, new or untried by present customers.

Last, but by far the best, advertising medium, consequently the most profitable, is the satisfied consumer; he is an advocate, solicitor and advertiser all in one, and his praise and sanction are worth more than all ads., newspaper talks or pamphlets combined. He knows there is no other way quite so good as ours and, when asked, will gladly say so. I think I can safely say that the greatest proportion of our increased sales of appliance and use of gas in every way is directly due to this source of advertising.

These customers may have been started by good newspaper ads. and concrete examples of our endeavors to give thoroughly good service, but they now form the basis of the greatest advertising campaign that can be realized, namely, kind words for your products and recommendation for its use, from one neighbor to another, while chatting over the garden fence or in the busy kitchen. It starts a chain of reasoning in the mind of the non-consumer something like this:

My neighbor has a gas stove; *she* seems well pleased.
I guess I can't afford one; but she is well pleased.
I wish I had a gas stove! If she is so pleased
I'm going to have a gas stove. Then I'll be pleased.

Discussion.

Mr. Ganser—In Norristown we have resorted, with great success, to a form of advertising with headings that are seemingly ridiculous and deceptive, of which I will give a sample:

"A PIG'S GREASED TAIL.

"This is a hard proposition to hang on to, but if you install a gas range in your kitchen, the cooking proposition will be one that you will hang on to for life."

"KEROSENE FOR FALLING HAIR.

"We do not recommend it because we never tried it, but we do know that a falling kerosene lamp often causes a fire. Let us pipe and fixture your house for gas lighting."

After using this form of advertising for some time, we heard a great deal of comment relating to it, until we thought it wasn't advertising, but only publicity. I then began issuing "ads." daily without letting the office force know what was going to be advertised, and then watched for results. People came in and told us that they saw our advertisement in yesterday's paper, and were then satisfied that it was really advertising. This form of advertising, while somewhat difficult to get together, is a great deal less expensive than display advertising, and is taken at a much lower rate than the other form. We sometimes have two or three "ads." of this character in all of the papers each day, but every one of them treating on a different subject. Speaking of window advertising, I think that your window is a better advertiser than a newspaper as a rule. You must get something into the window though, that is going to attract extraordinary attention. We have just equipped one of our windows as a kitchen, with an enameled sink, gas range, table with cooking utensils, and the floors linoleumed. The sides are imitation tile, and we have had crowds in front of our window for a number of nights. We also have a young man who is a competent demonstrator to give baking exhibitions weekly. I believe we pay too little attention to our windows as an advertising medium, and I believe, if you haven't tried it before, that, if you fill you window full of bread toasters, gas sad irons, or sad iron heaters, you will find that you have opened up a market for these appliances.

Mr. Bains—Mr. Rhoades brought out in his paper the point that newspaper advertising was a good thing, and it may be all right in a city where there are several daily papers; but I question very much if advertising in the small weekly suburban papers is a success. I have four weekly suburban papers in which I advertise, but the results from these advertisements would seem to prove that these papers are scarcely read. In order to reach our consumers, finding it was hard to get the people to come to the various local offices, we hit upon this scheme. All our bills are mailed, and we also mail our receipted bills, and naturally, where we cannot get the people to the office, there is considerable correspondence with our consumers. A year or more ago I got out a postal card, about 3 by 5 inches, having on one side the address of the Gas Company with a place for a postage stamp, and on the other side some descriptive matter. These cards are inserted in all outgoing mail, including bills. In addition to this, the prepay readers take them around when they lift the money and place them on each prepayment meter. I vary the cards by using different colored cardboard and various colored inks. In the spring, I urge people to have their appliances prepared for summer use; in the summer time, the postal card will describe gas ranges, water heaters, etc.; in the fall and winter, light appliances and good gas service. It is surprising the success that we have had from these cards. They cost very little to print and I would strongly recommend the smaller

gas companies to take up this form of advertising as a means of reaching the consumers, especially in scattered suburban territory.

Mr. Dutton—All these different questions of advertising when boiled down amount practically to the same thing. It is simply transferring things that you already believe in your mind, from the knowledge you have of the appliance, and knowing the conditions of the man desiring to use it, knowing these things and transferring it to his mind and creating in him the desire to have your goods. An "ad." of this kind isn't very complex, but it is very hard to write. Personality in a manager counts for a great deal, and the personality of a new business manager is instilled in the men working under him. The advertising man is so enthusiastic in his work that his enthusiasm goes out to his advertising when he isn't there. It is such a combination of advertising that we are after. It is well to be on good terms with newspaper men. It is an actual fact that an editor can talk to your consumers in a friendly way or keep quiet. We have advocated the circulation of a magazine monthly among our consumers, and in it we try to make some particular thing stand out. We instill personality into it, and carry that to the newspaper advertising. In this little booklet we have a gas range, and alongside of it is a man telling his story. Wherever that shows in a newspaper or in our magazine, the man is there telling his story. It is distinctly our cut and there is no other "ad." in the newspaper like it.

On motion of Mr. Lamson (seconded) a vote of thanks was tendered to Mr. Rhoades for his paper.

On motion of Mr. Keppleman, an adjournmen t was ordered. During the evening the Association attended the Orpheum Theater in a body.

SECOND DAY—MORNING SESSION.

The President called the meeting to order, and introduced Mr. J. H. Mansur, of Royersford, who read the following paper on

THE GAS METER.

To the average man, the gas meter is a profound mystery. He may have one in his cellar, but if he ever looks at it the only part that he sees, outside of the black tin case, is the small "clock" which registers the amount of gas he burns, and which, to his prejudiced mind, registers about 10 times as much as he burns. It goes on working whether he burns much or little, and when there is not enough gas to measure, sucks in a lot of air, for which the gas company charges full price, and sometimes adds a penalty when it is not promptly paid. He stands ready to dispute his bill, no matter what the amount, because he is firmly convinced that the meter is purposely set to cheat him, and there is generally a lurking suspicion in the back of his head that, no matter what he may do, the gas company is bound to get the best of him in the long run.

Now I am very far from saying that the gas man entertains the same opinion in regard to the meter, but at the same time I confess to a slight notion that, even though the gas man may be willing to admit he could not do without the meter, yet even he, in many instances, does not fully realize how much of his success in producing results for his company, as well as pleasing the public he serves, is due to the fidelity, accuracy and reliability of the meter.

It ought not to be necessary to say, to an association composed of gas men, that the meter, considered simply as a mechanical product, is not a haphazard combination of tin, brass and leather, of specified size and shape thrown together in any old way, but is the result of much thought and planning, based upon scientific ideas, and fortified by years of experience. Nor is the meter, as we have it to-day, the result of a single invention, but rather the outcome of a long series of eliminations and substitutions extending over more than half a century; the result of contributions of many minds, some of them from workmen at the bench, but all tending toward the one end of making an apparatus that should be durable as to materials, accurate under varying conditions, and so limited as to cost as to bring it within the reach of the smallest gas works.

The unit of construction by which the meter is made is the cubic foot, and is based on the theory that, by a certain number of revolutions, vibrations or complete repetitions of its action, it will register a cubic foot. For the purposes of doing this, the meter is practically divided into three parts, as I shall show later on, neither part having any communication with any other part except through the established way. If it gets through any other way, it is a fault which must be corrected. A horizontal table, containing the valves and recording mechanism, divides the upper part from the lower part, which is again divided perpendicularly, and contains the diaphragms or measuring mechanism. The measuring part of the meter is the leather diaphragm, as you already know. The other parts of th is mechanism, such as the guide wire, the flag wire, etc., are simply aids to the diaphragm in doing its work, and do not add anything to its cubical capacity whatever.

And here I might digress a few moments to say a word or two concerning the diaphragm itself. As so much depends on this part of the meter, it will occur to us at once that it must have occupied considerable thought and attention to make it a practical device. And such is the case. I suppose no other part of the meter has been the subject of so much experiment as the diaphragm, and yet it remains essentially the same as when first adopted. Not only have there been various styles of making it, but there have been almost innumerable attemps to find a perfect material to make it of. Sheet rubber, oiled silk, varnished muslin, have all been tried and found wanting, as well as numberless secret processes for coating the various substances; but after years of experimenting, and the elimination of one after another of promising substitutes, I am obliged to say that nothing else has been found to take the place of properly prepared leather. I admit it is not a perfect material, but its merits so far outweigh its demerits that I am convinced, as long as dry gas meters are made, the standard leather diaphragm will continue to hold its place.

I have purposely omitted all technical details as to the various stages the leather goes through before it takes its place in the meter, because I am not attempting to write a treatise on meter making, besides I give you credit for knowing, at least, that the leather goes through a systematic treatment of oils to render it pliable, as well as to close up the pores and make it gas tight.

If the accuracy of the meter depends so largely on the diaphragm, it would seem to be very important to know that it is not only made of the best materials, but also that it is of the correct size and capacity; and, therefore, a few words on this subject may not be out of place. The rule for obtaining the cubic capacity of a diaphragm is to square the diameter, multiply this product by .7854, and again multiply this product by the distance travelled. To apply this rule let us take the ordinary 3-light diaphragm. The diameter of the ring into which the disk is soldered is 8 inches. Now, applying the rule as given above, would give us a cubic capacity of 50 + inches, which, multiplied by 2 inches, the distance each diaphragm travels, would give 100 + cubic inches for each diaphragm, or about $\frac{1}{17}$ of a cubic foot, or 1,800 + cubic inches for both diaphragms. Thus, $8 \times 8 = 64$, $\times .7854 = 50$ + inches, $\times 2 = 100$ + inches $\times 9 = 900$ + cubic inches for each diaphragm $\times 2$ the number of diaphragms = 1,800 × cubic inches for both diaphragms.

The same rule would hold good for the 5-light meter. The diameter of the ring is 9 inches. Applying the same rule would give us 63 + cubic inches, which, multiplied by 2 inches, the distance travelled, would give 127 + cubic inches, or about $\frac{1}{14}$ of a cubic foot for each diaphragm, or about 1,778 cubic inches for both diaphragms. Thus, $9 \times 9 = 81 \times .7854 = 63$ + cubic inches $\times$ 2 inches = 127 + which $\times 7 = 889$ cubic inches for each diaphragm $\times 2$, the number of diaphragms = 1,778 cubic inches for both dtaphragms.

The same system of calculation is carried on, not only in the diaphragm but all through the meter. It would be manifestly absurd to provide a measuring device of a given cubical capacity, and at the same time not provide a gas way sufficiently large to supply that capacity, so we find that the area of all the pipes, valves, channels, etc., through which the gas must pass, is calculated to give full supply for the full action of the diaphragm, and probably a little more, so as to be on the safe side.

Before we conclude our study of the meter it is only proper that we should say a word or two in regard to the recording mechanism, which is placed in the upper part of the meter, and which I suppose is the part that both the gas maker and the gas consumer are most interested in. It may be noted that though it is a very important part of the meter, yet it is not directly connected with the measuring mechanism; that is to say, the gas in its passage through the meter does not come in contact with the recording mechanism at all. Having fulfilled its part by being duly measured its duty is done and it goes on its way to the burners, leaving the result of that measurement to be taken care of by another part of the meter altogether.

It is true that, in a certain sense, every part of the meter has a more or less direct influence on the result as shown on the dial, but the registering or recording part is purely mechanical or mathematical, and is the result of calculation based on the action of another part, and not, as in the other part of the meter, by the action of the gas itself. These two parts (the measuring and the recording) are linked

together by the vibratory rod called the flag wire, which extends from the diaphragm up into the recording works and changes the parallel or reciprocating motion of the diaphragm into a rotary motion which actuates the crank, valves, etc., as I shall show later on. On the upright crank is placed a worm or endless thread spiral which gears into a toothed wheel on a horizontal spindle which operates the first wheel of the index.

Referring to what was said about the diaphragm, it will be seen that the cubical capacity of the 3-light is about 1/18th of a cubic foot or about 100 cubic inches, for each diaphragm, or about 200 inches for both diaphragms. If, therefore, the wheel on the spindle which operates the index contains 9 teeth, it will be seen at once that, when the wheel has made one complete revolution, it will be 9 times this or 1 cubic foot. Inasmuch, however, as the small circle (or proving head) is divided into 2 feet, instead of putting a wheel of 9 teeth on the spindle, a wheel of 18 teeth is substituted, thus recording 2 feet at 1 revolution of the wheel, instead of 1.

And now, having described the theory upon which the m ter is constructed, as well as the most essential parts of its makeup, I want to go over the ground I have somewhat hastily covered, and endeavor to illustrate the rather tedious description I have given you. But before doing so, I desire to say that, when I began the preparation of this paper, I had it in mind to say a few words relative to the important place which, it seems to me, the meter should hold in the gas business, as well as to show how largely identical the interests of the gas man and the meter man really are, notwithstanding the very general opinion to the contrary. But as I found that this would lead me too far from the present subject to be in harmony with it, I gave up the idea, though I may perhaps take up that line of thought at a future time. I may say, however, I am thoroughly of the opinion that a harmonious agreement between the gas man and the meter man will most assuredly result to the advantage of both, and I hope the day is not far distant when the gas man will realize that the meter man is the most helpful and willing ally he has.

I have here a skeleton of a 3-light meter roughly tacked together, which I think will explain more clearly, than can be done verbally, some things of which I have spoken. I purposely delayed calling your attention to it until after the conclusion of the more formal part of this paper, so as to afford you more time for examination, and at the same time give me an opportunity for explanation without interrupting the reading of the paper.

Discussion.

Mr. McIlhenny—I congratulate Mr. Mansur on his very admirable paper. It is the best thing, in a general way, on the subject I have yet seen, and think it would pay gas companies to have copies of it handy, and, when a consumer complains about the gas meter, to present the complainer with a copy. I think that anyone reading it will be convinced that the gas meter is built along scientific lines. The gas meter, as Mr. Mansur suggested, has fulfilled one important function, in that it has provided a never ending joke for the newspapers; but the old idea is rapidly disappearing. Gas is not now sold at the high price that it one time commanded. When it was $4, $5 or $6 per 1,000, only the wealthy could use it, so we inherit the old prejudice against both gas and gas meters. Gas is now sold at low prices and is within the general reach of everyone in the community. Consumers have also found that those in charge of the gas companies are human beings like themselves, having a full share of honesty. An important step in that direction is to convince the consumer that he uses what he pays for and that the meter is a reliable instrument. It will pay the gas company to do everything it can to educate the consumer as to the reliability of the meter. It will be a good plan for the gas company to ask the customer to visit the company's office to see the working of the meter, or to see his meter tested. Another point in regard to meters that the gas companies should look after is to inspire greater respect for the meter among the gas company employees. A meter, if removed for any cause, before being reset, should be repainted so that it goes back in first class condition. The employees should be instructed to handle meters gently and carefully. They should not be rattled around in a wagon and jarred as it is a delicate instrument. The suggestion of Mr. Mansur to have an open meter in the office so that the consumers can see its construction, is a good one. There are few men, even those educated in mechanical engineering, who have the slightest idea of the construction of a meter. If the consumers were educated in this line they would be more willing to pay their bills at the end of the month.

Mr. Keppelman—We ofttimes use a very familiar illustration to satisfy a consumer who complains about the gas meter. The illustration is this: A wheel, to which is fastened at right angles 4 one-gallon measures, if revolved in water, will pick up and throw out, each revolution, 4 gallons. Now, if the measures are exactly right, it follows that no more nor less than 4 gallons of water will be picked up and discharged each revolution of the wheel. Applying this same principle to a dry gas meter, it is self-evident that, if the measuring compartments of the meter are exactly right, then the intake and discharge of gas, every time these compartments operate that amount of gas, will be measured as the size of these compartments provides, and the only deviation from this would be if, for some reason, these measuring compartments were contracted or expanded; then, of course, they would no longer be as originally made, consequently the meter would be either fast or slow. A suggestion of this principle to a consumer will very often satisfy him, because the application of the principle, while very simple, is at the same time convincing.

Mr. McCarty—I find that a great many meters are set against brick walls, and are hung from the tube screws without any support whatever. I think every meter should be placed on a shelf to support that meter, on account of its light construction. It naturally pulls the tubes and strains the meter in every way. The meter should also be kept from the wall to prevent the rusting of the box.

Mr. Gillingham—One point I want to bring up is about the standardization of the measuring capacity; that is, what should be the proper capacity of the meter in cubic feet. In getting meters from different manufacturers, one sample will have a capacity of a certain number of cubic feet, while another of like size will have a capacity of 10 feet more or 10 feet less. If the manufacturers would get together thereon it would be a big help to the gas men.

On motion of Mr. Keppelman (seconded by Mr. Butterworth) a vote of thanks was given to Mr. Mansur. The President introduced Mr. W. O. Lamson, Jr., who read the following paper on

COMBINATION RANGES.

In introducing this subject, it is not my intention to deliver to you a long and carefully prepared paper upon my experience with combination appliances; for, as a matter of fact, the introduction of this form of combination of coal and gas into domestic use has been of so recent date that we have not much data on the subject.

However, the advent of this type of kitchen range, in conjunction with the sale of straight gas ranges, opens up a topic of interest to every gas man here. It is, therefore, more my desire to have brought out, if possible, the necessity of such a type, what is being done by the commercial members of this Association in treating it, and also the opinion generally regarding the construction of the various makes now appearing on the market.

From my experience, in connection with the sale of gas for cooking, it has always been a problem as to the best method of building up the fuel consumption on our mains during the cold weather. Through the strenuous advertising that has been going on throughout the country for the past few years, it is very generally known that gas should be used for cooking, and making hot water during the summer; and it is generally used for that purpose. But just as soon as the first cool days come, the rush begins to get back to the coal range. Why? I think your consumers will generally concede that gas is as economical to use as coal; so, therefore, that is not the reason. Looking at the matter from all sides, it has always impressed me that kitchens without heat were the chief factor, although it may not be in every case.

However, the question of heat in cold weather must of necessity be an important consideration in every household. Therefore, the housewife argues, since she must have a coal fire to keep the kitchen warm, why use gas for cooking and have an additional expense? With the design of the coal range she is right, for it would be expensive to use for heat alone, and, therefore, our thoughts turn to the design of a type that will give the gas some chance. To my mind the matter deserves great consideration, for it will solve the problem for us. We want an appliance not too costly, that is built for coal as an auxiliary to gas, and one which combines the best q ualities of both.

A number of makes of combination ranges are on the market, some good and some very bad; and in introducing this new type to the public we should see that they are started right, and that the gas

man gets his share, by looking to the design of the appliance. I feel confident that if every man interested in the gas business will give this matter his consideration, in a very few years we shall see gas used generally for cooking throughout the entire year. There are other ways, of course, to bring this condition about, other than by the combination coal and gas range, or by the kitchen heater attached to the gas range; for where it is possible to heat the kitchen in conjunction with the rest of the house, nothing but a gas range should be used. However, this combination feature meets the present demand in some of our consumers' houses, and it is for us gas men to stand together and demand the appliance best suited for our interests.

Discussion.

Mr. Roberts—Mr. Lamson brings out the point, do we desire to have gas ranges built for gas and coal? The fact is, there are a great many combination ranges sold to-day in New York State and Pennsylvania. The type of range generally sold is ¾ coal and ¼ gas. I think it would be a good thing for gas companies to encourage a better type than that installed.

Mr. Ganser—In houses where there are no furnaces the combination range is a good idea, but where there is a furnace I say go back to the modern kitchen idea and work it up. In cafes and restaurants, where they need heat and a great deal of hot water, then your combination range is a capital idea. We have one in a restaurant that is giving perfect satisfaction in every respect, with the exception, possibly, that it makes too much hot water, which isn't a bad fault, as a large tank could be placed alongside and get the benefit of the additional hot water. For restaurant use there is a great field for combination ranges, but in the residence district, where almost every home has the cellar furnace, I say keep the coal out of the kitchen.

Mr. Sweeney—In a town of 7,000 people the combination range is popular, because half the residents own their own homes and half of the people do not have a furnace in the cellar. As to combination ranges I have experimented with three different kinds. The third I will speak of first because it was most unsatisfactory; that is the coal stove with the gas attachment to it and a 12 by 14 oven; I think that kind of stove does more harm than good because the work cannot be done with it. The second is the coal attachment. I have installed a dozen and where the water back is left out it works perfectly. The first one which comes nearest to an all-gas kitchen is the ¾ gas and ¼ coal, with a small, round, fireback. Right back of it is the copper coil for hot water in the summertime and an 18 inch oven to the right. They have to use gas all the year round and the coal gives sufficient heat for the kitchen.

Mr. Dutton—Gas kitchens are a success. We don't want men to go from this convention with the idea that it isn't possible to have successful gas kitchens. They certainly are a success; there is no question about it. We haven't had as great success as some of our neighbors have, but Mr. Brown can tell you of the number they have in use. Personally, I have tried this combination range, and I am familiar with a great many of them. They have proved a disappointment as far as gas consumption comes into the question. They don't fully meet the needs of the consumer. In all cases those who have the gas kitchen none would go back to a coal kitchen.

Mr. Brown—As Mr. Dutton has asked for the experiences of the Chester Division of the Philadelphia Suburban Company, I will say they have been very satisfactory indeed, in regard to the all-gas kitchen and furnace connection. I don't think I can add anything in regard to the value of the furnace connection. Our Company is not partial to combination ranges, and the few so far installed in the district have not been at all satisfactory.

In the absence of Mr. W. H. Merritt, his paper on the

MANUFACTURE OF COAL GAS

was read by Mr. Lamson, as follows:

In place of taking up the subject of the manufacture of coal gas in general, as assigned to me, I am going to limit this paper to the manufacture of coal gas with benches equipped with the Doherty bench fuel economizer, and the results as obtained in our plant.

We have four ¼-depth benches of 6's, two of the benches being equipped with the economizer. These benches were refilled from the ashpan up, during the fall of 1907, and equipped with the economizer by the Improved Equipment Company, of New York city.

I do not know whether the members of this Association are familiar with the method of returning a portion of the waste products of combustion under the grate bars of the furnace, as applied to gas benches, so I will give a short description of this method before giving the results obtained at our plant.

We use hot coke as bench fuel in our producers, and the depth of the fuel bed is maintained at about 4 feet. The stack dampers are adjusted so that they give a pressure in the furnace or producer as nearly atmospheric as possible, and the secondaries are adjusted so that an analysis of the products of combustion, well back in the flue below the lowest retort, will show an average of 18 to 19 per cent. of carbon dioxide, or CO_2, and 1 to 2 per cent. of oxygen, or O. The injector nozzle opening and air pressure are so adjusted that an analysis of a sample of the primary mixture taken in the space beneath the grate bars of the producer will show an average of from 6 to 10 per cent. CO_2 and 14 to 10 per cent. of O.

The producer gas rising from the fuel bed of the producer, and at a temperature above that required for ignition, comes in contact with the highly preheated secondary air from the secondary opening and a partial combustion takes place. This partial combustion is for the purpose of preventing any possible collection of carbon on the producer keys, thus decreasing the opening between the producer combustion chamber. The gas, after passing the small secondaries and between the keys of the producer arch, comes in contact with the balance of the secondary air issuing from the large tuyeres above into the combustion chamber. Here complete combustion starts. The highly heated products of combustion, in their passage around the retorts and before entering the recuperator, give up a certain portion of their heat to the retorts and settings. Entering the space immediately below the lowest retorts, the products of combustion are divided, one portion going to the injector and thence beneath the grate bars, the other portion entering the recuperator, where, by contact with the enormous area exposed, it again parts with a large portion of the heat it still retains, which heat is transmitted through the thin walls of the recuperator to be rapidly absorbed by the secondary air in direct contact. The secondary air rises by its own increase in temperature and volume, and finally enters the combustion chamber through the tuyeres at substantially the same temperature as the products of combustion when they enter the recuperator.

Following that portion of the products of combustion which is induced to pass to the injector, and from there is injected beneath the grate bars, these gases mix with the primary air issuing from the injector nozzle and pass up through the fuel bed of incandescent carbon. Omitting any consideration of the nitrogen element in the primary mixture, which acts merely as a diluent, we will only take into account the oxygen and carbon dioxide. As is well known, oxygen when it comes in contact with incandescent carbon combines with it and forms CO_2. Each molecule of this CO_2 contains 2 atoms of oxygen and 1 of carbon. The CO_2 molecule, as it passes through the deep fuel bed, is robbed by the carbon of 1 atom of oxygen, which combines with the carbon to form CO, the original CO_2 changing to CO, thus forming twice as much CO (by volume) as there is CO_2.

The CO_2 which passes beneath the grate bars and up through the fuel bed is subject to the same chemical reaction as that which applies to steam. At a certain temperature and under certain conditions in the presence of incandescent carbon an endothermic reaction takes place, resulting in the dissociation of CO_2 into CO and O, the oxygen combining with the carbon again in the form of CO.

It will be understood that this dissociation of CO_2 absorbs an amount of heat exactly equivalent to that generated when combustion takes place in the combustion chamber, resulting in the formation of CO_2. It will be seen that, if the percentage of CO_2 introduced beneath the grate bars of the producer is properly maintained, the absorption of heat due to the dissociation will be sufficient to maintain the temperature of the high temperature zone continually below the fusion temperature of the ash, thus permitting continuous operation of the producer without the formation of clinkers. This absorption of heat from the high temperature zone of the fuel bed does not detract in any way from the efficiency of the producer, but, on the contrary, adds materially to its efficiency. The heat absorbed by dissociation is merely carried in latent form from the point where it is of no value to the combustion chamber, or point of required high temperature, where it is of the utmost value.

By introducing CO_2 under the grate bars we secure heated dry gas, which acts only as a diluent until it reaches the temperature of dissociation. It has no quenching action, as steam has, upon the lower portion of the fuel bed, thus permitting continuous combustion in the lower portion of the fuel bed until ashes alone remain. The products of combustion that are injected beneath the grate bars do not pass through the recuperators, and all the heat they contain is, therefore, retained in the bench. The introduction of the products of combustion enables us to consume all the carbon in the lower por-

tion of the fuel bed that is usually withdrawn with the ash. From a practical standpoint these benches have reduced our cost of operation and are giving entire satisfaction, and we have no clinkers. We are able to control our heats and carry uniform heat, thus slightly increasing our yield of gas. These benches have been in continuous operation since their installation, and are running on a bench fuel of 235 pounds of coke per ton of coal carbonized, with an average yield of 60,000 cubic feet of gas per 24 hours per bench and a yield per pound of coal of about 5 feet.

Our two fillings equipped with the economizer were installed in the fall of 1907. The only parts of the filling that show any signs of depreciation are the retorts, and from present indications these will last about 4½ years from the time they were started. As far as we can determine there has been very little or no wear-and-tear on the filling below the charge floor; in fact, the producer is substantially in the same condition it was when first put in operation. We are making a saving of about 140 pounds of bench fuel per ton of coal carbonized over the results obtained on our other type of fillings.

To sum up the practical results obtained by the use of this new system of carbonization would say that probably the most important and valuable features of a bench equipped with the economizer are: First, the perfect control the operator has over the bench; second, a much longer life of filling; third, a marked saving in bench fuel; fourth, a considerable reduction in labor required to care for the furnace; fifth, an increase in candle feet produced from a pound of coal, very likely resulting from the fact that we are able to maintain high and perfectly uniform heats.

Discussion.

Mr. Rhoades—I have been very much interested in the paper. We also have these fuel economizers in operation, and in several instances found they are giving extremely good satisfaction. They reduce the coal and the amount of labor to keep the benches in proper running order. One thing we find advantageous to the yield of gas is the uniform and high heat.

Mr. H. D. Gillingham, of Wilkes-Barre, Pa., then read the following paper on

TYPES OF WATER HEATERS FOR RESIDENCES.

The selection of a water heater for residence work is a very broad subject, as the various types of water heaters for this purpose have increased rapidly during the past few years, and a description of each would be almost an endless task. I will, therefore, only briefly mention some of the smaller heaters, devoting the greater part of this paper to the larger ones.

We are all familiar with the ordinary tank heater, of either the copper coil or brass section type, which is connected to our regular 30-gallon kitchen boiler and gives a fair supply of hot water for domestic purposes. These heaters burn about 35 feet of gas per hour and heat the water at the rate of ¼ gallon per minute. The heaters themselves usually show a good efficiency, when tested under favorable conditions, but in actual practice this is not maintained, due to the fact that the uninsulated boilers radiate considerable heat from the hot water. It is usually a fact that more hot water is heated than is actually used, the balance being allowed to cool. The slowness with which the water is heated by this method is vexing to the consumer who desires a quantity of hot water at short notice. However, the selling price of the heater is low, therefore, they are quite popular.

A variation of this type of heater has lately been introduced by a manufacturer of kitchen boilers who makes a combination of boiler and water heater in one, the boiler having in the lower part a circular chamber which becomes smaller and continues to the top as a flue. In this chamber is placed the water heater and in this position is surrounded by the water in the boiler. This method tends to utilize more of the heat given out by the gas, with the finding that good results are obtained.

This heater is also fitted with a thermostat which, after the content of the boiler is sufficiently heated, cuts the gas supply down to a small flame, which continues to burn under the boiler and aids in keeping the water warm. In my judgment water is heated most efficiently when the burner is going at its full capacity, and when the supply of gas is cut down the operation is more wasteful than useful. I also think that, should a gust of wind from an open door or window blow out this small flame, the result would be that the water cools and the thermostat liberates the full supply of gas, with no pilot light to ignite the same. It is only fair to state here, in behalf of this system, that no report of accident has come to my knowledge; but the possibility, however, still remains.

Next in mind are the instantaneous heaters, which are designed for bathroom use, and do not aspire to the supplying of hot water for the general household uses. These heaters are placed in the bath room, usually having an outlet to the washbasin and one to the tub. They are nickel-plated, therefore, ornamental as well as useful. Their supply of hot water varies from 1 to 1½ gallons per minute, according to size of heater, and are most useful as an auxiliary to the hot water system in winter and indispensable in summer for the comfort of any of the family who may have to keep house alone.

We now come to the point as to the best hot water system to install for the customer who is anxious for hot water—a lot of it, and quick. He is willing to pay for the appliance which will produce this result. The problem has been solved by the perfecting of the "Instantaneous Automatic Water Heater" and the "Automatic Storage System."

The first of these two heaters consists of a long copper coil incased in a cast iron shell, under which is a set of powerful Bunsen burners. The heater is provided with a water valve, working directly against the gas valve, so that, as water passes through the heater, the gas valve is opened, the gas ignited from a pilot light and the water heated. This continues only so long as water passes through the heater, therefore, if a hot water faucet is opened in a few seconds hot water is pouring forth and the closing of the faucet also shuts off the gas at the heater. This means that the consumer only pays for the heating of such water as is used. This fact, in connection with the high efficiency of this type of heater, makes it the most economical method of heating water.

The thermostat, which is the secret of success in water heating, as employed on these heaters, acts as a governor, only allowing the proper amount of gas to be consumed in proportion to the amount of water passing through the heater, and can be regulated so as to keep the hot water very close to the temperature desired, and for which the thermostat is adjusted. These heaters are made in sizes to deliver 3, 4, 6 or 8 gallons of hot water per minute, using 1 foot of gas of 650 B.T.U. to heat each gallon of water, raising the temperature 65°, and showing an efficiency of over 80 per cent. There are two methods of installing these heaters: The first, or direct connected, is simply to admit cold water direct to the inlet of the heater and deliver the hot water to the house fixtures. The second, or re-heating system, which is preferable, is to connect the heater in the hot water line between the kitchen boiler and the hot water fixtures, thus giving the heater the advantage of any heat that may be imparted to the water while in the boiler, but insuring the consumer of unlimited hot water at the fixture.

Should the water from the boiler be sufficiently hot, the thermostat in the water heater checks the flow of gas until the temperature of the water passing through the heater lowers to such a degree as to allow the thermostat to open up the gas supply and additional heat is then imparted to the water. By this method, gas is saved and the consumer is assured of hot water at all times, and it also insures the heater being kept in operation all year around. This is especially true of such climates as have very cold water during the winter months.

These water heaters have their limit of capacity, however, and the mistake should not be made to put too small a heater on too large a job, as the customer is disappointed and the gas company has the trouble and expense of installing a larger size heater. Heaters of this type need a plentiful supply of gas during their operation, and when one is installed care should be taken to have service, meter and supply pipe to heater of sufficient size; also, to have a flue connection with a steady draft. The following table will aid in determining this

Rated Gallons of Water Delivered per Minute.

Heater	3	4	6	8
Gas per hour, cubic feet	180	240	360	480
Size meter	30-light	45-light	60-light	80 light
Size gas pipe, inches	1	1¼	1¼	2
Size water pipe, inches	¾	¾	¾	¾
Size flue pipe, inches	6	6	7	8

As to the size heater to be installed in any residence, the maximum amount of hot water desired at any particular time should be determined, but for an off-hand rule the following will usually fulfill the demand:

4-gallon heater—residence of 1 bathroom.
6 " " " " 2 bathrooms.
8 " " " " 3 "

This will also take care of the usual kitchen equipment of sinks, laundry tubs, etc., which are usually supplied with houses having

the above number of bathrooms. Consideration must be given, however, whether the heaters are to be used all winter or only for summer use, and in the latter case the heaters may be overloaded.

To accommodate larger users of hot water, the "Automatic Storage System" has been designed, and is suitable for residences and apartment houses. This system consists of a horizontal boiler, of 80 to 1,000 gallons capacity, erected above a multi-copper coil storage heater, which is constructed much the same as the automatic heater. It differs, however, in the arrangement of the coil and thermostat. The coil of this heater is composed of 7 separate coils, each connected into manifolds located on opposite sides of the heater; thus the cold water leaves the tank by way of the circulating pipe to the inlet manifold, crosses the heater through the copper coils to the outlet manifold and is returned to the top of the tank. This creates a circulation through the tank and all the water is heated. The thermostat in this system is in the tank, and when the required temperature is reached operates a "moment valve," which entirely shuts off the gas supply. When the water in the tank is drawn off, the temperature lowers, causing the thermostat to again operate the "moment valve," which opens the gas supply to its full capacity, which remains so until again shut off. The thermostat may be regulated to operate at any desired degree of temperature and is usually adjusted to open up on a drop of temperature of about 25° F. With this system, the tank and all hot water piping should be well insulated. This, together with the positive action of the "moment valve" makes it a most efficient storage system. The tank may also be equipped with a steam coil to heat the water during the winter from the steam heating plant of the building. These heaters are usually rated by the hot water delivery per hour to the tank and are made in sizes of 100, 200, 300 and 400 gallons per hour. The following table will give the proper size meter, piping, etc., to be used:

Gallons of Water Heated per Hour.

Size of heater	100	200	300	400
Size meter	20-light	30-light	45-light	60-light
Circulating pipes, inches..	1¼	2	2	2½
Gas supply, inches.	1	1	1¼	1¼
Cold water pipe, inches...	1	1	1¼	1¼
Flue pipe, inches	4	6	6	7

To arrive at the proper size system to install the following may be used as a guide. There should be a water heating capacity at a minimum of 20 gallons per hour per apartment in buildings of less than 8 apartments and 15 gallons capacity per hour for buildings of 8 to 20 apartments. If it is desired to figure various fixtures separately, estimate for bath tubs 20 gallons, washstands ½ gallon, laundry tubs 20 gallons, each time used. This system admits of various combinations of heaters and boilers according to the storage desired and the rapidity with which the heater must work to replenish the hot water. In the case of some of the very large boilers, two heaters are connected to it in parallel, thus giving a capacity of 800 gallons per hour.

In comparison to this, a unique storage system was exhibited at the Madison Square Garden show, which consisted of a 50-gallon boiler sheathed in wood, and the storage heater attached to same being capable of delivering 50 gallons of hot water per hour. The system being equipped with thermostat and "moment valve" made the outfit a very desirable one for moderate sized residences.

If our solicitors in advising water heater installations would first determine the proper heater to install, then devote their efforts to have the consumer purchaser that particular size heater or system, many more customers would be more pleased with their hot water service and the gas company would have fewer complaints to attend to.

Discussion.

Mr. Bains—One statement made by Mr. Gillingham I would question. In the instantaneous type of heater he recommends an 8-gallon heater. Now all those heaters are rated at about 1 foot of gas per gallon. An 8-gallon heater means that every time the kitchen sink is turned on, practically 8 feet of gas is used. In a 4-gallon heater, when the kitchen sink is turned on, practically 4 feet of gas are used. Most of the water is drawn from the kitchen sink. The large sized heater is pretty expensive when used in the ordinary residence, and I think it would be far better for us to install 2 small heaters, say, a 3-gallon or 4-gallon, 2 fours, or a 4 and 6. They don't cost much more and are much more economical in gas use.

On motion of Mr. Rhoades (seconded by a member) Mr. Gillingham was given a vote of thanks for his paper.

On motion of Mr. Keppleman, an adjournment was ordered.

SECOND DAY—AFTERNOON SESSION.

The afternoon session was taken up by a lecture by Mr. W. H. Fulweiler, on "Tar as Applied to Road Building," and the lecture on "Illuminating Engineering," by Mr. Norman Macbeth. The lectures were illustrated by means of lantern slides, and each lecturer was tendered a vote of thanks. On the concluding of the lectures an adjournment to the following day was ordered. The evening of the second day was taken up by a banquet and accompanying entertainment, held in the Karldon Hotel.

THIRD DAY—MORNING SESSION.

The proceedings were opened with the paper by Mr. J. H. Keppleman, on the subject of

GAS ARCS AND MAINTENANCE.

This paper is no more than a report of what has been done in our city with the arc lamp and its maintenance. The arc lamp was introduced in our city in the fall of 1901. Being in its infancy, we did not feel assured as to its durability; so, as a protection to our consumers and ourselves, we installed them on a 30-day trial. After convincing the consumer and ourselves that the lamp was entirely satisfactory, we started to bid for commercial lighting, which work we were unable to do prior to the introduction of the arc lamp.

Our proposition to the consumer was what we termed the "Rental System," but was simply a plan payment. On this system each installation was charged against the consumer at the rate of $13 per lamp; the rental, as we termed it, was 25 cents per lamp per month, and was credited to the initial charge of $13. This gave the consumer the ownership of the lamp at the end of a period of 4 years and 4 months, or when the entire $13 charge had been cleared, at which time the consumer received a bill of sale.

This plan was in vogue until the year 1905. We were then able to purchase lamps at a more reasonable figure, and gave the consumer the advantage by reducing the lamps to $8 each, installing them on a plan payment of $2 down and $1 per month, or a cash discount of $1 on a 30-day payment. This applied only to the indoor arcs and is the plan we are using to-day. I want to take this opportunity to mention a few of our prize installations:

Where Installed.	Lamps.
1—Carpet store	20
1—Gent's furnishings	11
1—Furniture store	13
1—Clothier	14
1—Queensware	11
1—Drygoods store	12
1—Bowling alley	15

All of the above had been using electricity exclusively. In order to secure this business we made a practical demonstration at their places of business, proving to them that their illuminating cost could be reduced one-half.

After making a success of commercial lighting our attention was directed to the larger public halls, of which there are seven. By hard work we were able to secure the business of all. The halls were also lighted by electricity prior to this time. Following is the list of halls with the number of lamps installed in each:

Name.	Lamps.
Auditorium	16
Mammoth Roller Rink	14
Academy Hall	7[1]
Natatorium	8
State Armory	5
Rajah Temple	11
Maennerchor	5

Encouraged by the success we had with the hall lighting we took up the matter of Market House illumination. There are six large Market Houses in our city, and we have been successful in installing arcs in 2 of them. One Market House is now being illuminated by 24 and another by 23 arcs; two are using open flame burners; the balance, electricity. We have good prospects of installing arcs in the two markets now using electricity.

In soliciting for industrial appliances we found a new field in factory lighting. This particular lighting was found tedious on account of conditions existing in each factory, but by careful study we have been able to overcome obstacles. The position of machines and the style of work done in different factories require more light than is ordinarily needed for general illumination. To give you an idea of the work that has been done along these lines I here give you a list of some of our largest installations and the class of work done in each factory.

1. Five-burner, inverted.

Nature of Business.	Lamps.
Motor cycles	53
Hosiery mill	19
Woolen mills	19
Cigar factory	18
Celluloid signs	14
Hosiery mill	10

and many more with smaller number of lamps. All told there are 310 lamps doing service in factories.

While looking up the indoor lighting the outdoor lighting was not neglected. We have been congratulated by gas men on the good showing we are making in outdoor lighting on our main thoroughfare, particularly with our flat rate system. This has been a success from the first installation. It has been worked just a trifle different than in some other towns. Each installation is metered, and a special line run direct to the lamp or lamps, as the case may be. The rates we charge are $4.50 per lamp per month for lighting from dusk until 11:30 P.M., six nights per week; $5 per lamp per month, seven nights per week, same period of time. We make a reduction of 50 cents per lamp where more than one lamp is installed on the same premises. A sundry charge of $13 per lamp, in addition to the regular monthly maintenance charge, is made against the consumer. Out of the amount received from the consumer per month we first close the gas account and the maintenance charge for the month, the surplus, if any, being credited to the initial charge. Our experience has been that in 1 year from date of installation the initial charge was closed. The surplus, which we find to be great after the first year, is taken care of by an account termed, "Gas Arc R. & M. Special." Under the flat rate system the consumer never procures possession of the lamp, the same remaining the property of the Company.

The outdoor lamps off the main business streets are installed on the rental and maintenance system. By this system, as stated before, the consumer becomes the owner of the lamp at the end of 4 years, as all the rental applies to the purchase price of $12 charged against the consumer when the lamp is installed.

Our maintenance charges are 25 cents per lamp per month for either 4-burner, upright, indoor and outdoor, or 3 burner, inverted indoor lamps. Where 10 or more lamps are maintained on the same premises our rate is 20 cents per lamp per month; for 5-burner, inverted lamps, indoor or outdoor, 50 cents per month; 10 or more 5-burner, inverted lamps, 35 cents per lamp per month. The actual cost per lamp for maintenance is 26 cents. This high rate is due to the fact that we are paying our trimmers an average of $2.50 per day, which includes evening work. Our experience is that it pays us better to pay higher wages and employ men for this class of work and have faithful service than to employ boys at a lower rate and have unsatisfactory service. When the consumer wishes to maintain his lamp we instruct him how to do so and sell him the supplies at a special discount.

Up to January 1, 1910, we had installed 1,589 lamps and are maintaining 1,103 lamps. This may not seem as great a number of lamps as should have been installed in a city of our size, but we handle our lamp business the same as we do the gas range business. Where we find a consumer discontinues the use of his lamp or lamps, and cannot possibly put them back into service, we hunt another consumer who is willing to purchase second-hand lamps at a reasonable sum. Through this method we can safely say that, up to the time of this writing, no second-hand lamps are to be had. So when we say we have installed 1,589 lamps we mean that with few exceptions these lamps are all doing work for our Company.

Discussion.

Mr. Lamson—In this paper Mr. Keppleman has the arc lamp situation well in hand. I am unfortunate to be in a district where they make a practice of renting electric lamps. The consequence is we were loaded down with second-hand lamps. We endeavored to sell these lamps from time to time with very little success, so as time moves on, and more improved lamps come on the market, we are constantly piling up our old ones. They are getting antiquated and out-of-date and people don't want them. I would like to ask Mr. Keppleman, when he speaks of 26 cents per lamp per month cost, whether that includes all types of lamps. We haven't been able to maintain inverted lamps at that figure. The upright lamps can be maintained at that, but not the inverted ones.

Mr. Rhoades—I would like to ask Mr. Keppleman what the electric rate is for outdoor lighting?

Mr. Keppelman—The charge for outdoor lighting is $7 per month, for service from dusk until 11:30 P.M.

Mr. Rhoades—You have a very nice thing of it. We are up against 75 cents for window lighting and $1.50 for outside arcs. In this war we are having now we know that some work is being done by the electric company at cost. We have found that our inverted arcs are easier to maintain and cheaper than uprights, consequently in inside lighting we are putting in inverted arcs and have very good success. A year ago about this time we had in the storeroom 150 arc lamps. In spite of the electrical opposition, we not only put out that 150 but installed 250 new, up-to-date inverted arcs; but it took constant, hard work, with the most careful salesmanship.

Mr. Creason—It is not quite clear in my mind that which Mr. Keppelman says is the cost of maintenance.

Mr. Keppelman—The cost of maintenance is 26 cents.

Mr. Cresson—For what sort of lamps?

Mr. Keppelman—All together; they all cost 26 cents. This answers Mr. Lamson's question also.

Mr. Frick—I think an explanation of the high cost of maintenance is in the fact that the time of the men who work on lighting and extinguishing the lamps is charged against maintenance, too.

Mr. Keppelman—We not only take good care of the lamps, but we also keep a man in the office every night until 9 o'clock. He is the man who lights all outside lamps. He stays until 9 o'clock, answers all calls over the city in regard to arc lamps, and if anything is the matter he goes out and fixes it. This practice adds to the expense and is included in the 26 cents. I have heard of cost and maintenance being as low as 20 cents, but we have not been able to make a profit on that maintenance. We give our patrons the best of service. If you walk up and down our streets you will see a great deal of arc lighting. We have a great deal of that business, due to the careful consideration that we give the consumer.

The President introduced Mr. John A. Frick, who read the following paper on

AIR, STEAM AND TEMPERATURE MEASUREMENTS.

A paper on these three subjects can be made entirely technical and mathematical, or discussed from a purely practical standpoint. In this paper I have endeavored to avoid elaborate theoretical discussion, and to confine myself more particularly to the practical application of air, steam and temperature measuring devices to the everyday operation of water gas sets.

We all know that results obtained from water gas machines vary from day-to-day. The expression, "a good day yesterday" or "a bad day yesterday" are quite common. Now, if we can put our finger on the reasons for that good or bad day and be able to anticipate them, then something has been done in the right direction. It is just as important to know why results fell off as it is to know why results were good. You will all agree that, after the day's run, it is comparatively easy to explain the "why." If you can keep tabs on your results from run to run instead of from day-to-day you stand a far better chance of making every day a good day. Just here is where the air, steam and temperature measuring devices will help you out.

Air Meter.—All of you know the pressure in inches thrown by your fan, at the fan and at the generator, but do not know the quantity of air going through the fire, which is the important factor. If your steam governor on your fan engine is in working condition, and the fan is not overloaded, you will have the same pressure at the fan with the generator air valve open or closed. Therefore, you will have the same pressure at the fan with an open or clogged fire or with a dirty machine, but will not get the same amount of air through the set. As this is an important item for uniform results the question naturally arises how to overcome this evil. The air meter will give you the desired information.

It is a meter of the Venturi type, in the blast main near the generator, so as to measure the rate of air being delivered to the generator. Pressure pipes are run from the meter to a differential gauge on the operating floor. When any air is passing through the meter a difference of pressure is shown on the differential gauge, the quantity of air flowing through the meter being indicated by the difference in pressures shown. Thus, with the fan running and generator valve closed, your ordinary pressure gauge at the fan will show, say, 20 inches, but there will be no reading on the differential. Now, with the fan running and generator valve wide open, your ordinary gauge will still show 20 inches, but the differential will show a reading of 3 or 4 inches. By varying this differential a corresponding varying quantity or volume of air is put through the generator and set.

You will notice that, after 4 or 5 hours' running, the reading on the differential gauge will begin to decrease, showing that the fire is clogging up, and in order to introduce the air at the same rate as before it will be necessary to raise the generator valve higher. By maintaining a constant differential reading the quantity of air delivered per minute is constant. You will also note that as a rule, when the carburettor valve is raised, the differential decreases, necessitating the further raising of the generator valve. These meters have been on the market for some time and have proven very reliable instruments. They are adaptable to any machines and are not prohibitive in price. They are particularly desirable when the set is called on to produce its maximum make per hour with unfailing regularity.

Steam Meters.—Now, having the air meters under control as to quantity delivered it is just as important to do the same thing with steam. The usual way was to attempt to govern this by so many turns or fractions of a turn on the steam valve. If the boiler pressure was uniform at all times this wouldn't be so very far wrong, but a recording steam pressure gauge will soon disabuse your mind as to this uniformity of pressure. We naturally conclude that, if the rate of air delivered to the set can be controlled and measured, why not do the same thing with our steam? Again the manufacturers have come to our aid and we are able to obtain a highly satisfactory measuring device for steam. It is a meter working on the Venturi principle, calibrated to read directly in pounds per minute. On a reverse-make set two meters are used, connected close to the generator shell in the up-and-down steam lines where they enter the generator. Pressure pipes from the meters are run to the direct reading meter gauges on the operating floor.

Instead of depending upon a certain number of turns of a valve and a varying boiler pressure we are able to control, in pounds per minute, the quantity and rate of steam desired. It will not be difficult at all for you to very readily determine the pounds per minute of steam which most economically suit your fuel and operating condition. Having control of the amount of air and steam, the next thought which suggests itself is the proper determination of heats.

In former times to be a good gas maker consisted in having a good eye for color. This, to say the least, was a most unsatisfactory state of affairs. It allowed too much of the personal factor to enter. Besides, in this day and generation good gas makers are very scarce and one is quite frequently obliged to break in green men, much to the detrimental effect on results and the nerves of the superintendent. By the use of pyrometers, however, we are able to read our heats directly in degrees F., and not in glasses. It seems strange that, of all the industries where heats are of vital importance, the gas industry should be the last to adopt instruments which actually measure the heats with precision.

Pyrometer.—Advantage has been taken of the fact that two different alloys in contact at one end, when subjected to heat, generate an electric current, the intensity of this current being proportional to the heat to which the thermopile or fire end is subjected. These fire ends are inserted in the superheater, on a level with the upper and lower sight cocks, and leads from them are carried to a voltmeter which is calibrated to read in degrees direct.

A rotary switch throws the voltmeter into connection with either couple as desired. We now can ascertain the exact heat in degrees at the top and bottom of the superheater, and can read them with a graduated variation of 20°. In regular and normal working the temperature at the superheater top will vary scarcely at all, while at the bottom, which point is called upon to do most of the work of fixing the gas, there will be a considerable variation. This variation is easily controlled and should be kept within certain limit. Thus, when the temperature at the top is above that at the bottom, we say the heats are out of balance and we immediately set about correcting this fault.

Capacity.—When the proper balance with respect to temperature in the fire and in the fixing chambers has been obtained, the gas maker is ready to use a running schedule. To determine or adopt a schedule the normal capacity of the apparatus must be known. With anthracite coal for generator fuel this normal capacity is not far from 55 to 65 cubic feet of gas per square foot of grate area for each minute of run. With gas house coke for generator fuel, 50 to 65 cubic feet of gas per square foot of grate area for each minute of run will give fair results.

Length of Run and Make per Run.—The length of blow and run will vary for different fuels and blast conditions. With anthracite coal a run of 5 minutes, and with gas house coke a run of 4 to 5 minutes, should give good results. Assuming a capacity or make per square foot of grate per minute of 55 cubic feet of gas, the make per run should be 55 × grate area (in square feet) × actual time (in minutes) steam valve is open.

Steam per Minute.—About 30 pounds steam should be supplied to the generator for each 1,000 cubic feet of carburetted water gas made. For down-runs the amount of steam should be less than that of up-runs by about 10 per cent., because there is some condensation in the cold ashpit during the up-run. Therefore, about 28 pounds of steam per 1,000 cubic feet of gas made should be used on the down-runs, and 32 pounds on the up-runs. The total pounds of steam per down run should be about equal to the cubic feet of gas per square foot of grate per minute of run (with anthracite coal this is 55) × grate area × 28 ÷ 1,000. The gauge on the steam meter reads directly the pounds of steam delivered per minute. It is only necessary, then, to open the steam valve supplying the generator until the steam meter gauge pointer moves to the desired figure. The steam per minute of up-runs may be estimated in a similar manner, using the figure 32 instead of 28.

Length of Blow and Air per Minute.—Knowing the amount of gas per run, the amount of air per blow and the length of blow may be determined. When air is supplied to the generator, preferably at a rate of not less than 100 cubic feet per square foot of grate for each minute of blow, and when the live fuel bed is maintained at a depth of approximately 6½ feet, fair results should be obtained, and under these conditions about 1,400 cubic feet of air should be used for each 1,000 feet of gas made. The air per blow will then be 1,400 × make per run ÷ 1,000, and the time blowing should be air per blow ÷ 100 × grate area in square feet. The nominal length of blow can be somewhat shorter than thus determined, so that the length of blow will be in even minutes. The air per minute will be the cubic feet of air per blow divided by the actual minutes blowing, and air per minute should not be less than 100 × grate area in square feet. Knowing the quantity of air per minute, there will be found opposite this in the table, which is furnished with the air meter, the proper reading of difference in gauge levels to be carried on the differential gauge of the air when blowing.

Size of Fuel.—The foregoing general information applies to a set operating on broken anthracite coal. If large sized oven coke is used for the generator fuel, the amount of steam and air per 1,000 cubic feet of gas made will probably have to be increased. You will note under steam per minute, it is stated that about 30 pounds should be supplied to the generator for each 1,000 cubic feet of carburetted water gas made. We have, in some instances, run as low as 22 pounds of steam per 1,000 cubic feet of gas made, and this we attribute to closer, denser and more uniform fuel conditions in the generator than ordinarily. You will note in capacity that we give 55 to 65 cubic feet of gas per square foot of grate area per minute on anthracite coal, and 50 to 65 cubic feet for coke. We have, in some instances, run higher than this, apparently still obtaining good results.

Referring now to the air per 1,000 cubic feet of gas made, will say the figure 1,400 is a fair average. We have and are, in many instances, running 1,300 cubic feet of air per 1,000 feet of gas made, while, in other instances, we are running up higher than 1,400 cubic feet.

If the air per 1,000 feet of gas made exceeds 1,400 cubic feet to any large extent, you can feel pretty sure that the hot valves are leaking and part of the air is going up the reverse-make pipe from the generator to the carburettor and not through the grates, as is figured. The same is true of the steam when the run is put on. Therefore, with leaky hot valves we should expect both high steam and air per 1,000 feet of gas made. You can see, then, unless the hot valves are tight and the apparatus in as good condition as a steam engine, the best results cannot be obtained, and that the steam and air meters act as indicators to tell you the condition of your apparatus.

Co clusions.—In conclusion I want to draw your attention to points in operation which bear directly on being able to control the blast, steam and temperatures in known quantities. A "low make per run" can be accounted for by a dirty fire, a poor fire, poor coal and incorrect records. Right here it is well to say that, unless the generator fire is in a good, healthy condition, it is absolutely useless to try to get good results.

A dirty fire is the result of improper cleans, shown by blowholes and black eyes, infrequent cleans, excessive steam, which is shown by soft clinker, or lack of steam causing hard clinker; excessive blast, which gets the fire to a high heat and causes it to fuse and clinker; low blast is shown by coal not being consumed; low blast

is shown also by incomplete combustion at stack where there should be 18 per cent. to 19 per cent. CO_2. Blast pressures to be increased until this is reached or until fire begins to weaken. High coal per 1,000 is caused by poor coal, improper blowing, improper amount of steam, and also cold weather, lay overs, radiation and leaking at stack valve and cleaning doors.

Improper blowing means too high or too low a blast. The primary object in blowing is to get complete combustion, and to get this combustion as near the generator as possible. One pound of carbon burning to carbon dioxide (CO_2) develops 14,440 B.T.U., while 1 pound of carbon burning to carbon monoxide (CO) evolves only 4,320. Hence the necessity of complete combustion. This heat developed in the generator is put to its full use in the carburettor. If, then, you will introduce the proper amount of air to the generator and steam during the run and have your heats at 1,350° to 1,400° and keep the fire in a healthy condition, you cannot fail to make gas at normal rate. If, with the generator blast wide open, there is still incomplete combustion, it is necessary to give the carburettor more blast, which should be done during the last part of the blow in any event, so as to burn all gases in the machine and allow as small an amount of CO to escape at the stack as possible.

An excessive amount of steam will form a soft clinker and means a high percentage of CO_2 in the blue gas. Every per cent. of CO_2 will drop the candle power 4 per cent. Lack of steam means hard clinker and a decided falling off in the make. Before the use of the steam meters we were accustomed to a very decided falling off in the make as the fire became dirty or just before cleans. We always have a higher make per hour with a clean fire than with a dirty one. When the air and steam meter is in use this is not necessary, as we are able to note the decrease in flow as the fire becomes dirty, and by raising the blast valve maintain a constant supply of oxygen for combustion with the carbon. In the same way we supply a definitely known amount of steam at any time, and can control the condition of the clinkers on the grate, having, of course, a good steam distribution. This enables us to make any combustion of runs which will hold up the heats and also consume a greater percentage of the carbon on the grate bars, which otherwise would be thrown out with the clinker and ash at cleans.

Low oil efficiencies are due to the poor oil, improper heats, dirty set, imperfect sprays and poor judgment in rate and quantity of oil used per minute. Low heats mean excessive make of tar, while high heats will result in naphthaline and lampblack.

From the foregoing it is readily seen that, given the proper air differential, steam differential and heats to carry during the operation of the machine, you can hardly fail to get good, uniform results. However, blowholes through the fire, a deep bed of ash on the grate, black eyes and clinker, will ruin results. Hence the slogan of all successful gas makers is, "Keep the fire in a hot and healthy condition." It is to this end that we make use of the air, steam and temperature measuring devices.

Discussion.

Mr. Bains—The steam and air meters and pyrometer are a great improvement over the old methods used in water gas manufacture. With the old-style method of operating, a man would guess at a certain length run-and-blow, then guess at a certain number of turns of the steam valve. He would guess at the speed at which his blower should run, and then, at the end of the day, would figure out how much gas he had made per day per run. If results were not good the second day he would try another combination, and probably from these two combinations he would, in 1 or 2 weeks' time, hit upon a fair balance. With the air and steam measuring devices and pyrometer, before starting up, an operator will decide that he wants to make so much gas per day. To make this amount of gas he will require so many pounds of steam and so many cubic feet of air. To use these quantities of air and steam it will be necessary to run-and-blow certain definite periods, which we will calculate beforehand, not overlooking in these calculations the time taken for coalings and the time for cleaning. He also knows about the proper heats that he should carry in his superheater. Having calculated on paper the method of operating, he then instructs the gas maker to blow-and-run so many minutes, and use so many pounds of steam per run, as shown on the steam meter; to use so many feet of air per blow, as shown on the Venturi meter, and carry certain heats in the superheater, as shown on the pyrometer. At the end of the day's run, or in fact within a comparatively short time after he has started operating, a check on the make will show that he is making per run practically the same figure that he calculated to make before starting the machine. With these devices there is absolutely no guesswork on the part of the gas maker; there is no guessing at heats by the eye; there is no variation in the air supply, due to a choked fire or other cause; there is no variation in the amount of steam used, due to variation in boiler pressures. Another important feature is that, with the old-style method, it will take anywhere from 1 to 3 weeks to break a man in to operate a water gas machine, and even in that length of time there is more or less a question as to the character of his results. With these devices, it is only a question of operating valves and levers and a man with any intelligence at all can master the operation within 2 or 3 days. The results from the use of these measuring devices are: Better efficiences, saving in materials used, and a more uniform product. I have had these devices in use for 3½ years, and they have been in every way a great success.

Mr. Graham - I think Mr. Frick sets out very simply the working of the different devices, and he has made a statement that might indicate there is a little theory about it. It is not theory, but has been worked out in a great many plants as he stated. On one end of the machine you have an air measuring device and steam meter showing what you put in; on the other end you have a device showing what you get out. The whole thing works out all right. The devices that the gas maker has to handle are so fixed that he knows what he is doing—I will not say that this lessens the responsibility of the superintendent. If anything he should be on the job as much, if not more, than before. He must see that his orders are being carried out and that the proper amounts of air and steam are running.

Mr. Keppelman—We are using an 8-foot 6-inch set, and when it was sent to us it was estimated that it would make a million feet of gas in 24 hours. With these devices added, it would be nothing unusual to make 1,400,000 feet. It does not make any particular difference as to the size of the machine. If it is rated at a certain amount in 24 hours you can add a great deal to the capacity of it with these devices.

On motion of Mr. Keppelman, Mr. Frick was given a vote of thanks for his paper.

To Bind the Proceedings.

On motion of Mr. Gillingham, seconded by Mr. Ganser, it was recommended to have the Proceedings of last year's convention combined with those of this year's and put up in book form. [Referred to Council.]

(To be Continued.)

Recent Patent Issues.

Prepared for the American Gas Light Journal by Royal E. Burnham, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 10 cents.

955,874. Inverted Burner for Incandescent Gas Light. A. H. Humphrey, New York city.

955,903. Gas Lamp. A. Rector, New York city, assignor to Rector Gas Lamp Company, same place.

955,915. Gas Purifying Apparatus. E. Schmiedt, Aschaffenburg, Germany.

955,949. Safety Burner. J. W. Dearing, Los Angeles, Cal., assignor of one-half to W. S. Bullis, same place.

955,970. Process of Charging Upright Gas Retorts. E. G. B. Korting, Mariendorf, near Berlin, Germany.

955,973. Inverted Gas Burner. J. Lederer, New York city.

956,019. Manufacture of Gas. A. Zindler, New York city.

956,199. Gas Producer. S. B. Sheldon, South Bethlehem, Pa.

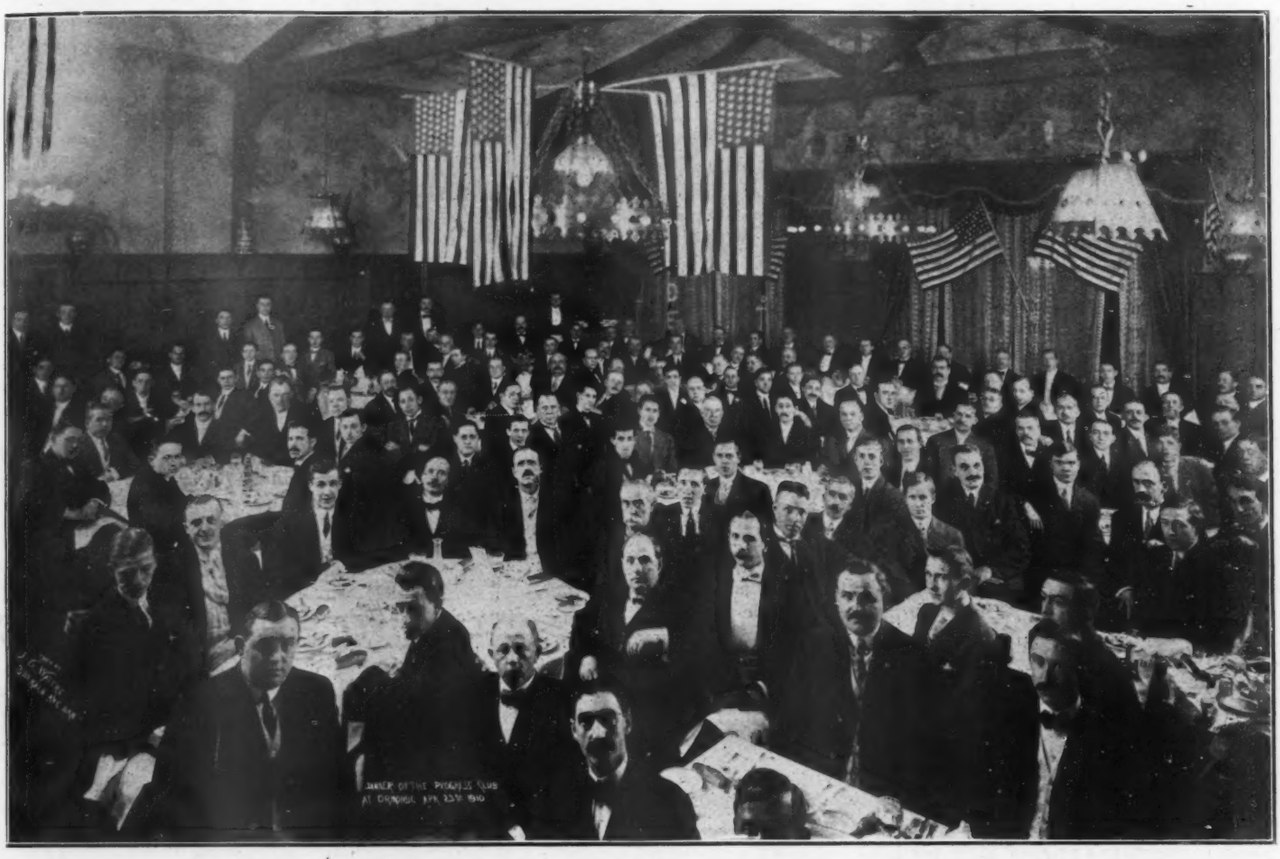
956,371. Method of Distilling Coal. H. Koppers, Essen-on-Ruhr, Germany

The Progress Club, Brooklyn Union Gas Company.

This Club was organized January 6th, 1906, and had its inception at the hands of the seven stove clerks of the Company, Mr. Geo. W. Gatehouse, now Manager of the Appliance Department, being its first President and Mr. Ernest Draycott its first Secretary.

From the beginning the employees of the Company manifested an interest in its meetings, the main object of the organization being concerned with the education of those in the appliance department, but its influence spread to the other departments at such a rapid rate that it now "points with pride" to a membership of nearly 300.

A fraternal spirit is established by the exchange of ideas and information through social intercourse, actuated by a strong leaning to



educating through the "Question Box Committee," which is ever open for questions and answers in any sense pertaining to the gas industry.

Messrs. M. Elton Brown, E. L. Shultz and Geo. Burkett succeeded to the Presidency in the order named, each of whom well contributed his share to the success of the Club, and the present officers have taken up the work with a zeal and enthusiam that speak well for the future.

The present officers are: President, Edward M. Smith; Vice-President, Ernest Draycott; Secretary, F. P. Sandkaut; Financial Secretary, C. O. Chichester; Treasurer, A. H. Arnold.

On the evening of Saturday, April 23d, the Club had a dinner which was, nicely set out and served in the large dining room of the Ormonde restaurant, Fulton street and Nostrand avenue. The attendance surpassed the Committee's most hopeful wishes, and the enthusiasm of the active members well showed a disposition to lean toward Progress that harmonizes with the thought that there is real progress in working for the best interests of all concerned.

Items of Interest
FROM VARIOUS LOCALITIES.

A FORTNIGHT ago we reported the sale of the Grand Ledge (Mich.) Gas Company. The new proprietors are in full control, and the executive management of the concern is as follows: President and Secretary, Mason Soper; Treasurer, Joseph Marshall; General Manager, Elmer Edwards. The Company will make important changes in the manufacturing division.

DR. R. E. W. SOMMER has resigned the position of gas inspector for Milwaukee, Wis. The office is to be combined with that of City Chemist. Here is a case of beneficial hindsight.

"P. T. V.," writing under date of the 27th ult., incloses the following: "Section 85 of the revised ordinance on tax account that are being prepared by the Council of Norfolk, Va., specify that hereafter any person who shall engage in the business of furnishing or supplying illuminating gas for lighting and fuel account shall be obliged to pay into the city treasury a fee of $1,000.

THE main system of the Springfield (Ills.) Gas Company will be notably extended this summer.

THE proprietors of the Independence (Mo.) Gas and Water Company are considering the advisability of reconstructing the existing plant. Either reconstruct or rebuild; the latter plan would probably be the better.

MR. ARCHIBALD S. WHITE, President of the Columbia Gas and Electric Company, which controls the lighting situation in Cincinnati, was voted a salary of $25,000 per annum, at a meeting of the Directors held about a week ago. He subsequently declined to accept the salary, saying that the salary matter, on personal account, could remain in abeyance until a certain contingency happened. His declination was thus concluded: "When we pay dividends on our common stock then I will accept something in the way of salary." And there is a lot of common stock! Later he accepted $15,000!

MR. R L. SLEIGHT sends this, under date of the 28th ult.: "Attorney W. S. Galbraith, of Calumet, Mich., was in the office of the Houghton County Clerk last week, to perform the last sad rites for the Bessemer Gas Company, a body corporate. The Company files notice of dissolution by reason of forfeiture of its franchise. The Bessemer Gas Company was organized by J. A. Langenbach, now of Calumet, for the purpose of providing gas for lighting and cooking in Bessemer, Gogebic county. The city of Bessemer granted the Company a franchise and the city of Bessemer declares it officially dead of inanition. The Directors, all Calumet men, agree. This Company was a twin of that corporation which would have provided the village of South Range with gas had not its plant blown up some 2 years or so ago. The explosion did for that Company what the more legal and formal action of yesterday has done for the Bessemer Company."

THE Board of Gas and Electric Light Commissioners has approved the application of the Boston Consolidated Gas Company for permission to expend $568,803, received through the sale of certain real estate to balance equal expenditures on construction account.

THE proprietors of the Decatur (Ills.) Railway and Light Company have awarded the contract for a complete, new water gas apparatus to the Gas Machinery Company, also those other necessary accompaniments: An exhauster, tar extractor, oil storage tank, etc.

WE are indebted to Mr. W. H. Hodge, Chicago representative of Messrs. H. M. Byllesby & Company, for a copy of the "Daily Oklahoman," which surely goes to show that the Byllesby Company, and

the General Manager of its gas and electric properties in Oklahoma, (Mr. F. H. Tidnam) are firm believers in the value of newspaper advertising. In the named paper, which is the leading news conveyor of Oklahoma City, which bears date of April 22d, the Oklahoma Gas and Electric Company figures as an advertiser to the extent of 2 entire pages, and thereon are told, in double-pica type, double-leaded at that, the stories which concern the Company and its doings with the officials and residents of this marvelously developing city. It is noteworthy that from its lines one learns that the gas increase (its sendout) up to the first of April, 1910, as compared with the like months in 1909, amounted to 35 per cent.; the gain in electric sendout for the like comparative period was 51 per cent.

AT the annual meeting of the Cumberland (Md.) Gas Light Company the officers elected were: Directors, Jno. McIlhenny, Robt. Shriver, J. L. Griffith and R. K. Swayne; President, Henry Shriver; Secretary-Treasurer, Robt. Shriver; Superintendent, Wm. Miller.

"W. V. M.," writing from Wilmington, N. C., under date of the 29th ult., incloses the following: "At a meeting of the Directors of the Tidewater Power Company, of this city, quite important action was registered, which rather goes to show that this corporation means to be of positive benefit to the city. The report to the shareholders (this concern is in control of the lighting interests of the city) was made by Vice-President Gouverneur, in the absence of President Hugh MacRae. Its lines showed that the Company had prospered during the year. All of the retiring Directors were re-elected, with the exception of Mr. Chas. N. Evans, Cashier of the Southern National Bank, elected as member of the Board, which is now composed of Messrs. Hugh MacRae, M. F. H. Gouverneur, M. J. Heyer, Oscar Pearsall, B. G. Worth, J. G. L. Gieschen, Jurgen Haar, Junius Davis, Jas. H. Chadbourn, J. V. Grainger, Geo. R. French, G. Herbert Smith, Edward Ahrens and C. N. Evans. The Directors met and re-elected the old officers for the ensuing year. The price of illuminating gas was reduced from the present price of $1.75 per 1,000 cubic feet, less a discount of 10 cents per 1,000 for prompt payment, to a price of $1.60 per 1,000 feet less a discount of 10 cents per 1,000 feet on bills paid by the 10th of each month. This means that the net price for illuminating gas will henceforth be $1.50 per 1,000 feet. The schedule is effective from May 1st at the reduced price. The action of the Directors in this regard is in line with the Company's policy in making rates as low as an consistent with good service and a fair return on the investment, and the reduction will be greatly appreciated by the consumers of illuminating gas."

THE speaker of the evening, on the occasion of the last (May 5th) meeting of the "Men's Club," of Elgin, Ills., which session was held in the Guild Room of the Church of the Redeemer, was Col. Ira C. Copley, President of the Western United Gas and Electric Company. His theme was "The Relation of the Public Service Corporation to the City," and he treated it in most effective manner.

MR. J. B. COMSTOCK, for 6 years with the Westinghouse Electric and Manufacturing Company, at its East Pittsburgh works, and for 4 years Manager of its "Publication Department" and "Printing Plant," resigned from that service last month, to accept a like position with the P. & F. Corbin Company, New Britain, Conn. Prior to Mr. Comstock's connection with the Westinghouse Company he filled the same position with the Corbin Company that he is now called to resume.

MR. J. A. MAYERS informs us that the Cruse-Kemper Company has been awarded a contract to install, at Atlantic Highlands, N. J., a gasholder, purifier, meter, yard connections and oil tank, for the new gas plant to be installed there by Philadelphia capitalists, who propose putting in a high pressure system covering the territory of Highland Beach, Keansburg, etc. The contract for the water gas set has been awarded to the United Gas Improvement Company.

THE Northwestern Gas Light and Coke Company, of Evanston, Ills., is planning for the erection of a new plant to cost about $300,000, on a tract of 20 acres, recently purchased by its proprietors on the western outskirts of the city. There is no guesswork about this.

"S. R. M.," writing from Omaha, Neb., under date of the 2d inst., forwards this mention: "All of the employees of the Omaha Gas Company assembled in the office of the Gas Company, on Howard street, shortly before 6 o'clock Friday evening, to bid good-bye to Mr. Isaac Battin, the retiring Treasurer and Engineer of the Company. Every man and boy in the employ of the Company was present. Mr. G. W. Clabaugh, Vice-President and Secretary, paid a beautiful tribute to the character, fidelity and faithful service of Mr. Battin, who had been with the Company for nearly a quarter of a century. On behalf of the employees he wished Mr. and Mrs. Battin a quiet, peaceful and happy life during their remaining days. In token of their affection and esteem they presented him with an elegant rocking chair. In accepting the grand old veteran suitably expressed his great appreciation of their earnest co-operation with him in the building-up of the Omaha Company."

PERMISSION has been given by the Board of Gas and Electric Light Commissioners for the purchase by the Edison Electric Light Company of the property of the Lexington (Mass.) Gas and Electric Company.

PRESIDENT A. B. BEADLE, of the Clinton (Ills.) Gas and Electric Company, has been in conference with Albert Sandt, the Company's Manager, looking to the rehabilitation of that plant.

THE proprietors of the Peoples Gas Company, of Shenandoah, Ia., will expend close to $20,000 this year in extensions. A main item in the listing is a gasholder up to retaining 75,000 cubic feet, and next in importance is the item of main extensions, the arranging of which calls for the placing of 3 miles of pipe.

THE proprietors of the Seymour (Ind.) Gas and Electric Light Company have at last gotten to the point where they have decided to install a station meter. Resident gas men in that section will remember the prodigal waste of natural gas for which that section was famous 20 years ago. It was considered of such little account that it was neither measured nor stored, and the waste went into the billions of feet and hundreds of thousands of dollars.

HENRY C. ROSS has been relieved of his duties as Master Mechanic and General Superintendent of Construction to the Consolidated Gas, Electric Light and Power Company, of Baltimore, Md.

MESSRS. MARATT & ZIEGLER, who own a controlling interest in the natural gas supply of the Muncie (Ind.) district, have decided to authorize the construction of a large storage holder at that point. *Mirabile dictu!*

THE city of Alexandria has awarded these contracts on account of the operation of the Alexandria (Va.) municipal gas works: For rebuilding benches, Jas. Gardner, Jr., Company; for tar output—year ends May 31, 1911—to Warner Bros., Boston; gas coal, to W. A. Smart, Alexandria.

IN the reorganization of the Portland (Ore.) Gas Company these officers were elected: President, Guy W. Talbot; Vice-President, F. G. Sykes, New York—he was formerly President of the concern; Secy.-Treas., George F. Nevins; Asst. Secy.-Treas., W. H. Arning, New York. Mr. Talbot is also Vice-President of the American Power and Light Company, the holding corporation which is also taking over the old Portland Gas Company. This seems to indicate that the Hill interests have taken over the gas and electric lighting supply of Portland, which we sincerely hope is the case.

"WHAT do you think of this?" So questions Mr. A. L. Spencer, who also forwards the following along with the query: "According to an opinion recently handed down by the Mayor of Fredericksburg, Va., the City Gas Works and the Rappahannock Light and Power Company can no longer sell supplies, and an officer has been detailed to warn both concerns against the continuance of the practice. The matter was brought to the attention of the authorities through some work the Rappahannock Company did on an electric sign for Cordley Wright, the local colored barber. It seems that the Company sold the sign and that its workmen placed it, which, owing to the fact that the Company does not take out a license to sell supplies, is against the city ordinances governing the matter. Some of the local electric supply houses complained about this, and when it was brought to Mayor Wallace's attention he said that neither of the concerns was privileged to sell supplies and that before doing so they must take out a license."

AT the annual meeting of the Madison (Wis.) Gas and Electric Company the officers elected were: Directors, A. P. Lathrop, R. B. Bryon, C. F. Covley, Jno. Corscot, F. W. Hoyt, John Grinde and A. E. Proudfit; President, A. P. Lathrop; Vice-President, John Corscot; Secretary and Treasurer, John St. John; General Manager, Frank L. Cross. Mr. Cross assumed charge the 1st ult.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

CHARLES H. WADELTON,
MANAGER.

MONDAY, MAY 9, 1910.

The Market for Gas Securities.

"Touched bottom, eh! Well, I'm not so sure of that," said a well-known operator in gas shares to the writer yesterday—Thursday. And the further remark was volunteered that lots of people thought the bottom had been touched when Consolidated got below 150 something over a month ago. In any event, between times of writing, Consolidated managed to get below 130. Mid-week, however, saw a change, and to day (Friday) at noon the shares were selling at 135½, with 135¾ asked. All we can say is to repeat that Consolidated is an investment at any figure under 175.

Brooklyn Union managed to go to 140, at which figure it also looks very tempting. The total indebtedness of this Company, as to bonds and stocks, represents an investment of only 4.85 per 1,000 sold. Washington (D. C.) is again on the increase, and Peoples, of Chicago, is at the absurdly low price of 107½. Lacledes are firm, around par. The regular semi-annual dividend on the preferred shares of the Massachusetts Gas Companies is payable the first prox.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

MAY 9.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$73,177,000	100	135¼	135½
Central Union Gas Co.— 1st 5's, due 1972, J. & J.	3,000,000	1,000	98	101
Equitable Gas Light Co.— Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	3,500,000	100	155	165
New Amsterdam Gas Co.— 1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101½
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	35	50
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98¼	100¼
New York and East River— 1st 5's, due 1944, J. & J.	3,500,000	1,000	104	107
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Northern Union— 1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	—	75
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	137	140
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¼	107
Yonkers	299,650	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	.65	.70
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	500,000	1,000	90	98
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	73	73¼
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	105¼
Cincinnati Gas and Electric Co.	29,500,000	100	92	93
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90½	91
Preferred	3,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	—	105
Mortgages, 6's	3,600,000	-	—	118
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	458,000	—	102	105
Detroit City Gas Co	5,000,000	50	—	50
" Prior Lien 5's	4,619,000	1,000	97	100½
Detroit Gas Co., 5's	881,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,225,000	1,000	104¼	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	108	108¼
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	86
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis.	10,000,000	100	100½	101
Preferred	2,500,000	100	90	95
Bonds	10,000,000	1,000	102¼	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	350,000	1,000	106	108¼
" 6 per cent. scrip, due 1910	100,000	25	60	60½
Massachusetts Gas Companies, of Boston	25,000,000	100	80	80¾
Preferred	25,000,000	100	91½	92
Montreal Gas Co., Canada	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	107¼	107½
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104¼	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.— 1st Mtg. 5's	751,000	1,000	100	102
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgages, 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112¾	115
General Mortgage, 5's	2,465,000	1,000	90	95
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	100	104
Washington (D. C.) Gas Co.	1,000,000	200	354	355
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	361	—

Advertisers' Index.

New advertising, or changes in standing ads., to assure attention the issue following their reception, must be in hand on Wednesday.

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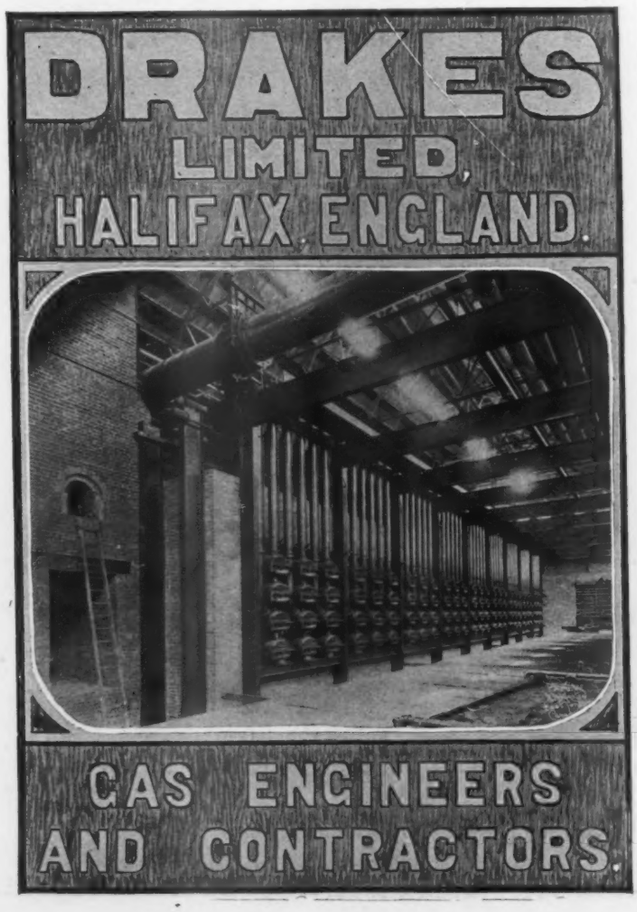

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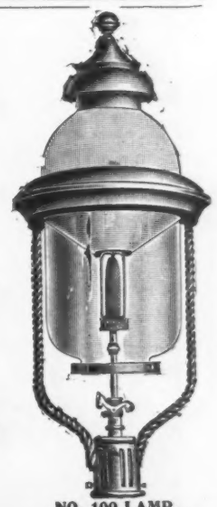
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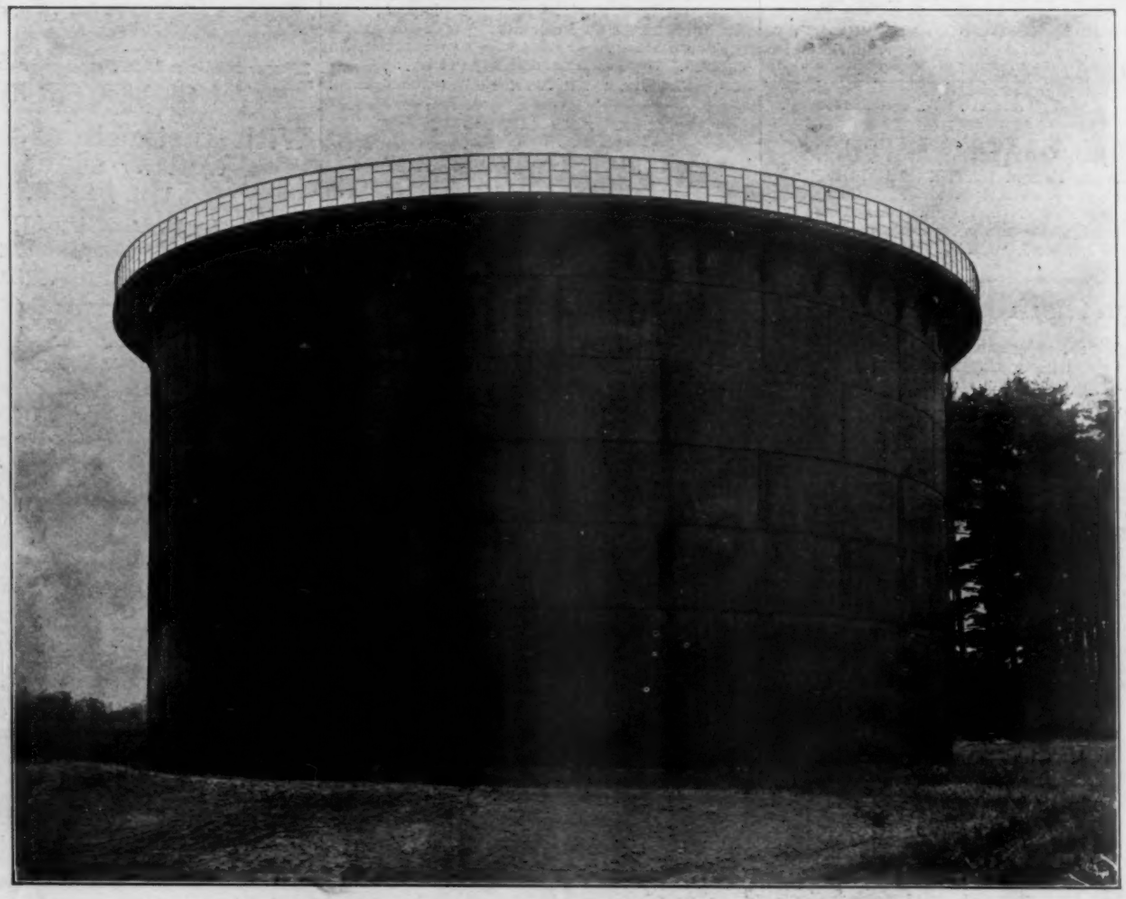

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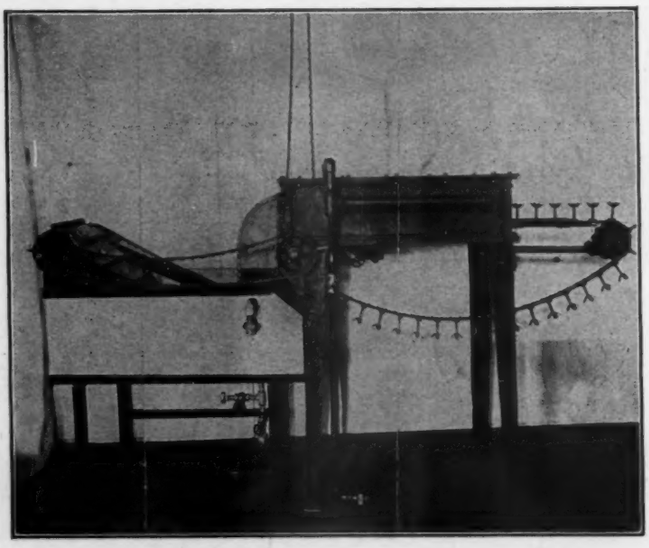

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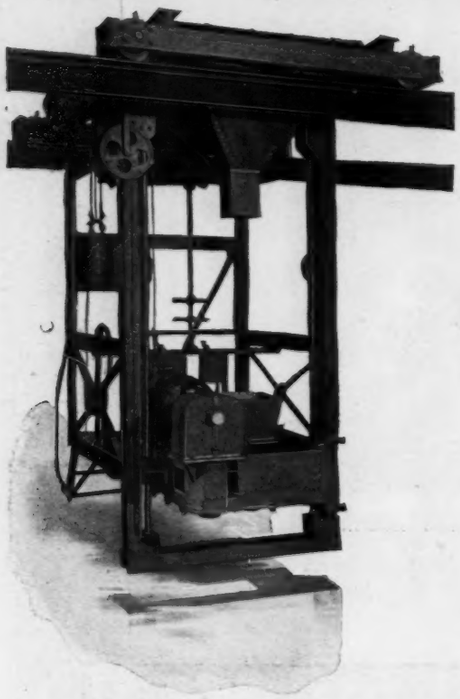

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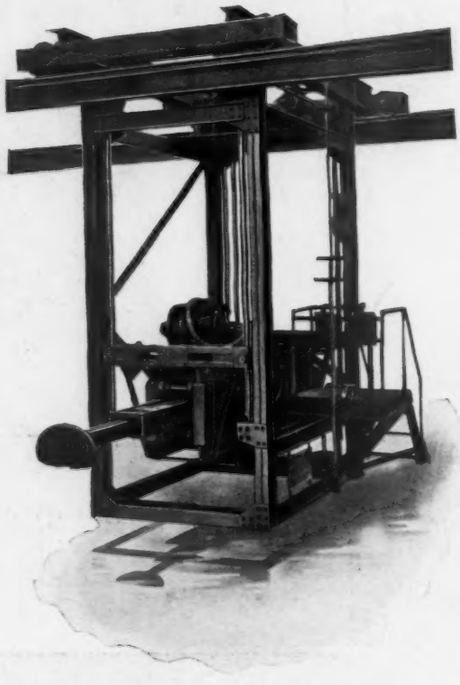

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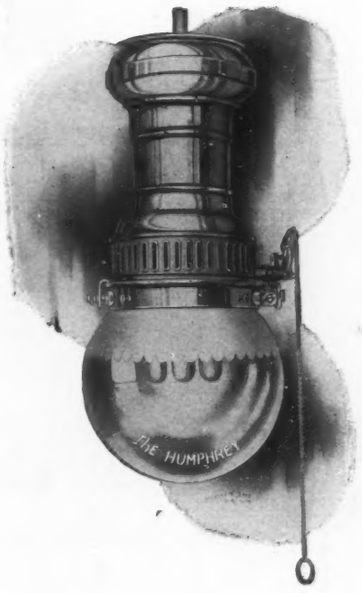

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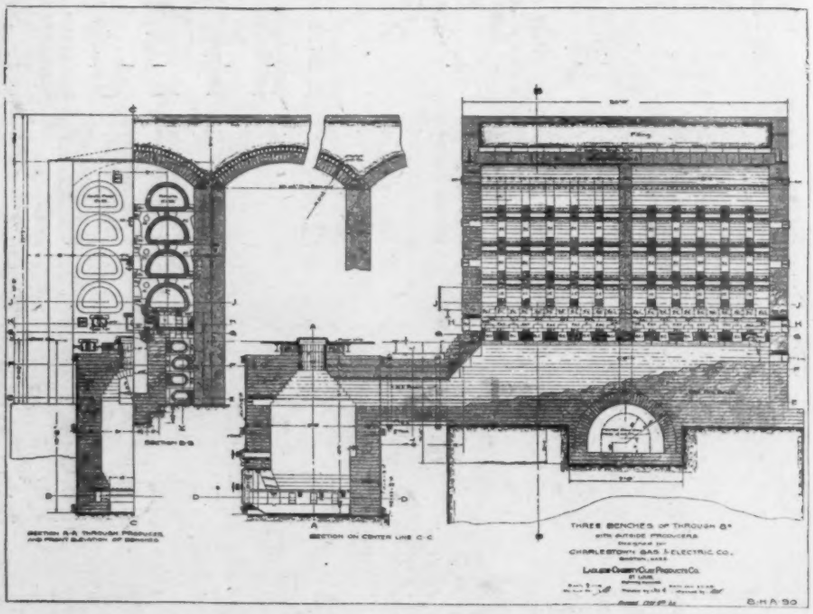

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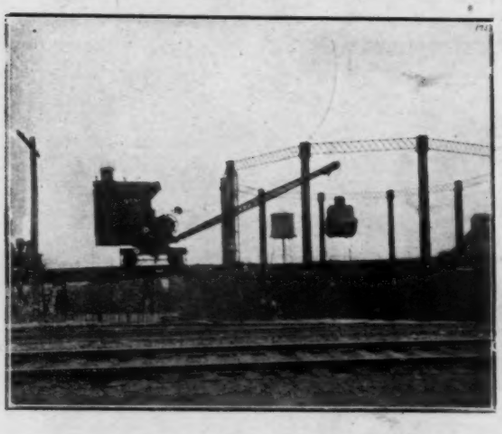

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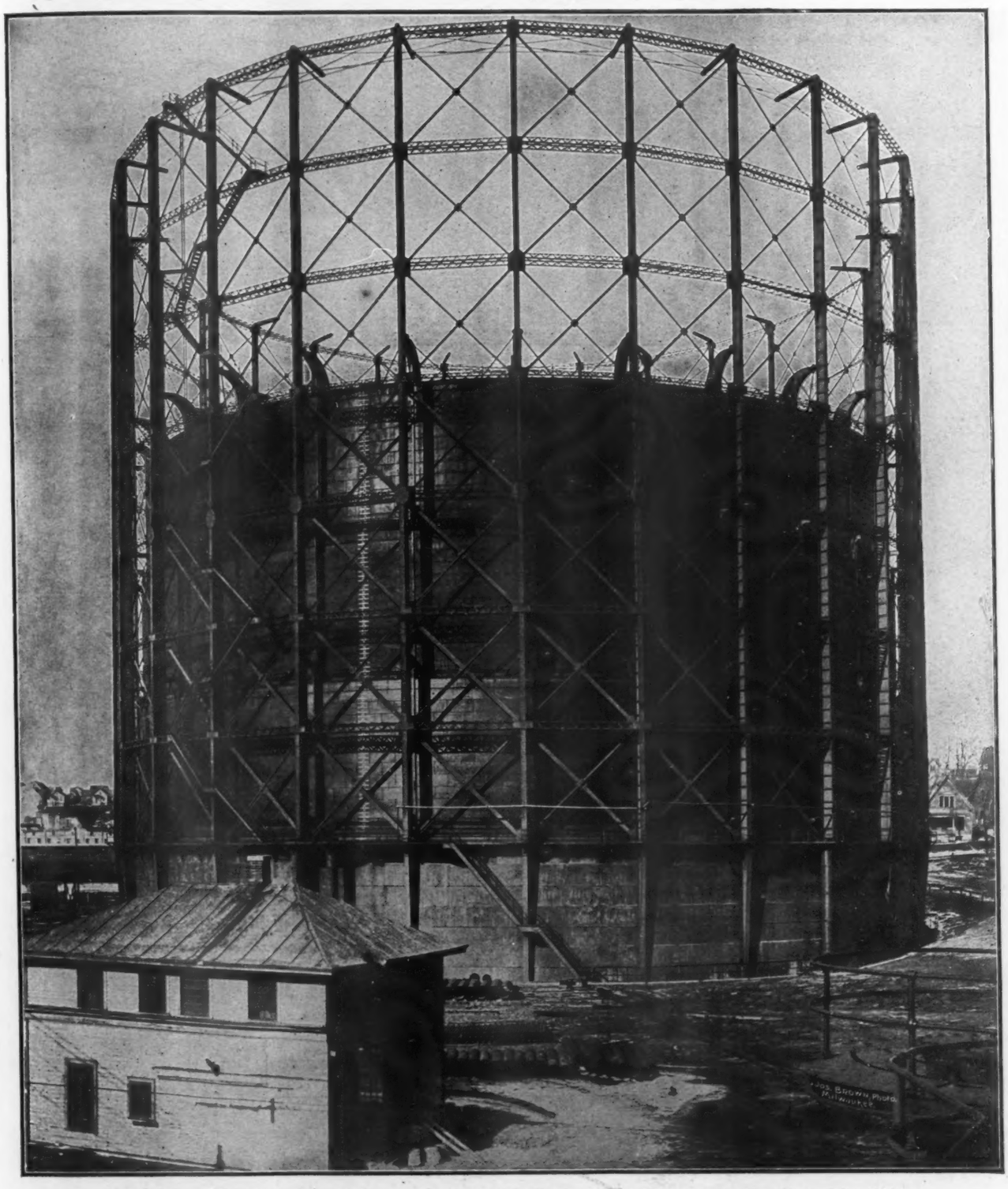

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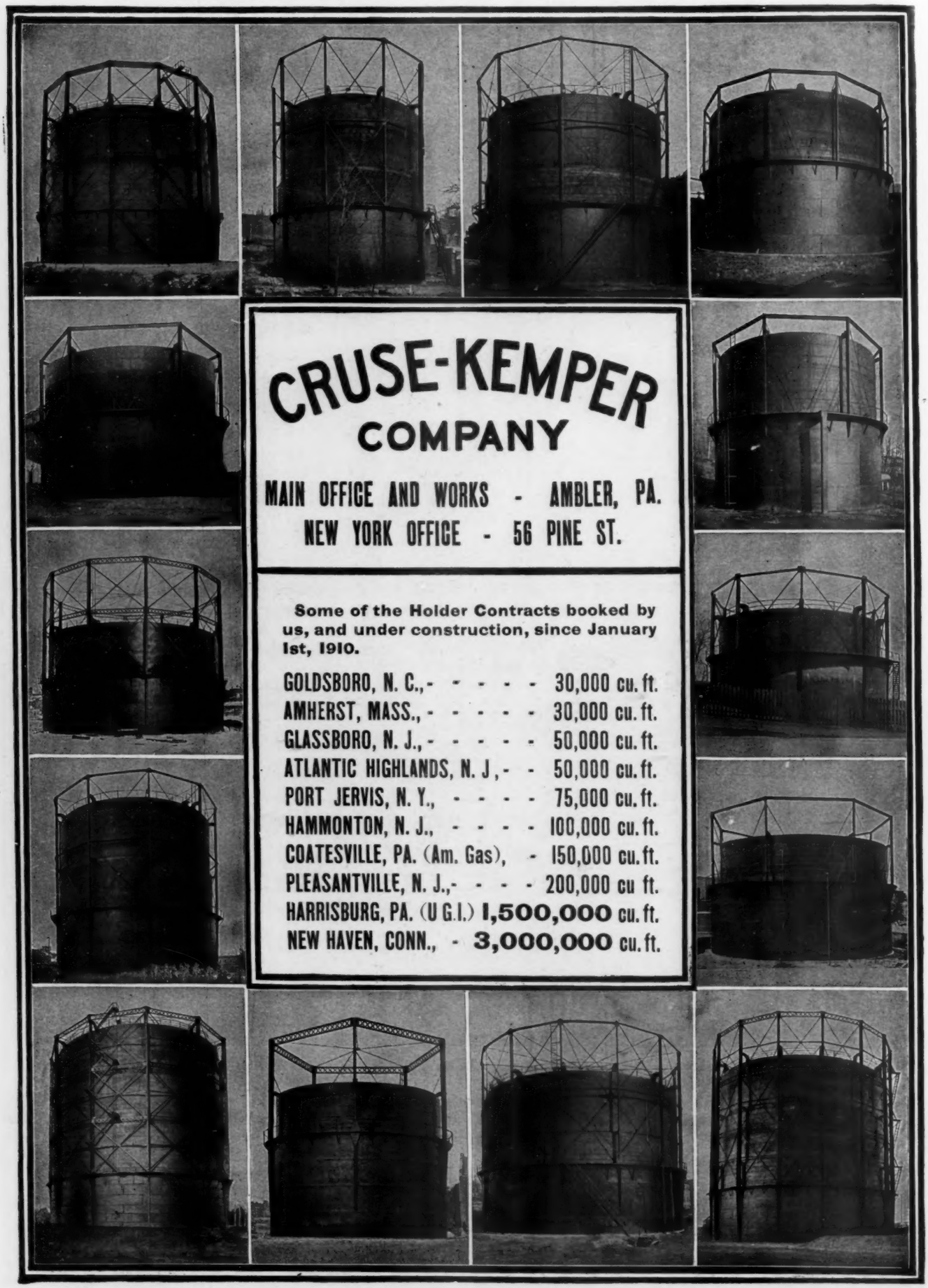
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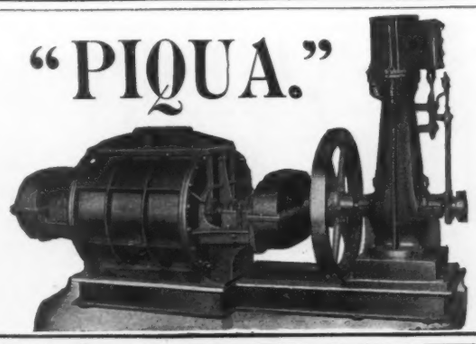

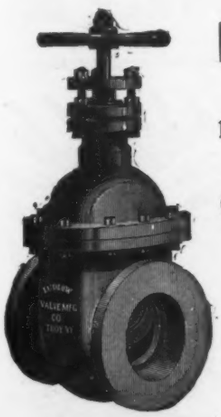

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Compiled from the questions and answers sent out to the Practical Class, Trustees Gas Education Fund.

Section I. General Definitions. Section II. Manufacturing Materials. Section III. Manufacturing Plant---Construction and Operation. Section IV. Distribution System and Consumers' Appliances. Section V. Chemical. Section VI. Physical. Section VII. Masonry Construction. Section VIII. Miscellaneous.

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NORTHWEST GAS EQUIPMENT COMPANY, PORTLAND, ORE.

PUBLIC LIGHTING TABLES FOR MAY, 1910.

[Communicated by The American Meter Company.]

Day of Week.	Table No. 1. FOLLOWING THE MOON. Date.	Light.	Extinguish.	Day of Week.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Date.	Complete Lighting in 1 Hour. From Time Given.	Complete Extinguishing in 50 Minutes. From Time Given.
		P.M.				P.M.	A.M.
Sun.	1	7.30	2.30 A.M.	Sun.	1	6.47	3.52
Mon.	2	7.30 L.Q.	3.10	Mon.	2	6.47	3.52
Tue.	3	7.30	3.40	Tue.	3	6.47	3.52
Wed.	4	7.30	4.00	Wed.	4	6.47	3.52
Thu.	5	7.30	4.00	Thu.	5	6.47	3.52
Fri.	6	7.30	4.00	Fri.	6	6.47	3.52
Sat.	7	7.30	4.00	Sat.	7	6.57	3.42
Sun.	8	7.30 N.M.	3.50	Sun.	8	6.57	3.42
Mon.	9	7.30	3.50	Mon.	9	6.57	3.42
Tue.	10	7.30	3.50	Tue.	10	6.57	3.42
Wed.	11	7.30	3.50	Wed.	11	6.57	3.37
Thu.	12	7.30	3.50	Thu.	12	6.57	3.37
Fri.	13	11.20	3.50	Fri.	13	6.57	3.37
Sat.	14	12.00 A.M.	3.50	Sat.	14	7.07	3.27
Sun.	15	12.30 F.Q.	3.40	Sun.	15	7.07	3.27
Mon.	16	1.00	3.40	Mon.	16	7.07	3.27
Tue.	17	1.20	3.40	Tue.	17	7.07	3.27
Wed.	18	1.40	3.40	Wed.	18	7.07	3.27
Thu.	19	2.10	3.40	Thu.	19	7.07	3.27
Fri.	20	2.30	3.40	Fri.	20	7.07	3.27
Sat.	21	2.50	3.40	Sat.	21	7.12	3.22
Sun.	22	No L.	No L.	Sun.	22	7.12	3.22
Mon.	23	No L. F.M.	No L.	Mon.	23	7.12	3.22
Tue.	24	No L.	No L.	Tue.	24	7.12	3.22
Wed.	25	7.50 P.M.	10.00 P.M.	Wed.	25	7.12	3.22
Thu.	26	7.50	11.00	Thu.	26	7.12	3.22
Fri.	27	7.50	11.50	Fri.	27	7.12	3.22
Sat.	28	7.50	12.30 A.M.	Sat.	28	7.12	3.17
Sun.	29	7.50	1.10	Sun.	29	7.12	3.17
Mon.	30	7.50	1.40	Mon.	30	7.12	3.17
Tue.	31	7.50 L.Q.	2.10	Tue.	31	7.12	3.17

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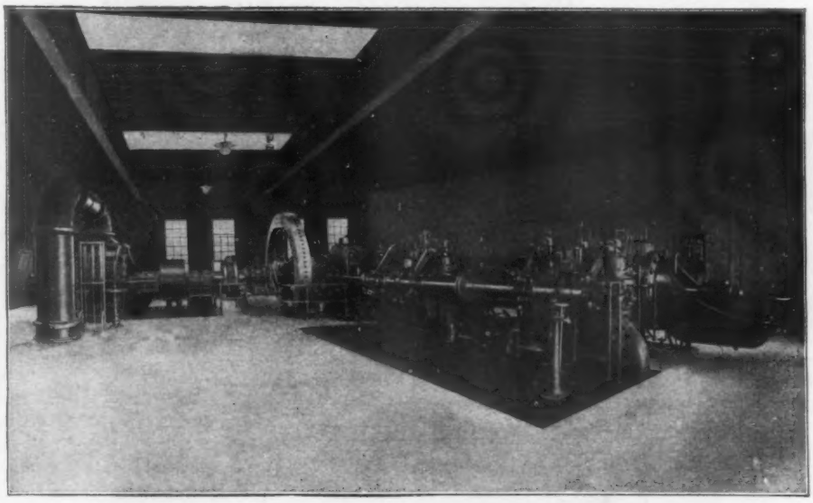
A half century of experience, up-to-date engineering and shop facilities embodied in these **World Famous Gas Exhausters.**



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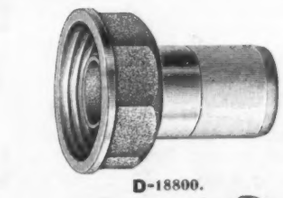
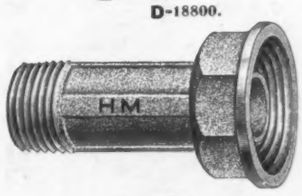


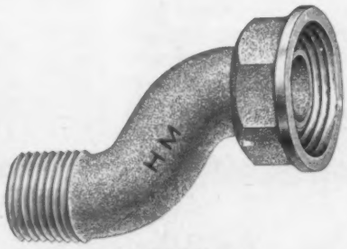
D-18800.



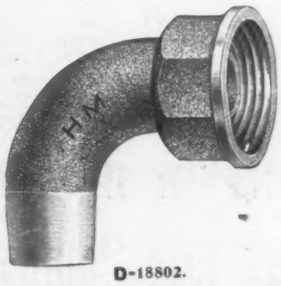
D-18801.

D-18803.

(Patent Applied for.)
D-18808.



(Patent Applied for.)
D-18804.



D-18802.

(patent Applied for.)
D-18807.

D-18806.

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Indicating instrument installed on Gauge Board for Gas Maker. Recording instrument installed in Superintendent's Office.

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MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, October, 1910. New York City. Officers: President, Wm. H. Bradley, N. Y., City; Secretary, A. B. Beadle, 29 West 39th street N. Y. City.

Canadian Gas Association.—Annual meeting, June, 1910, Hamilton, Ont Officers President, J. S. Norris, Montreal, P. Q.; Secretary and Treasurer, A. W. Moore Woodstock, Ont.

Empire State Gas and Electric Association.—Annual meeting, Nov., 1910. New York City. Officers: President, C. R. Huntley, Buffalo, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street. New York City.

Guild of Gas Managers of New England.—Annual meeting, December. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, A. K. Quinn; Newport, R. I.; Secretary, Walter G. Africa, Manchester, N. H.

Illinois Gas Association.—Annual meeting, time, March, Chicago, Ills. Officers: President, A. S. Harrington, Chicago, Ill.; Secretary-Treasurer, C. B. Strohn, Elgin, Ill.

Illuminating Engineering Society.—Annual meeting, January —, 1911. Meetings of Sections, monthly. President, W. H. Gartley, Philadelphia, Pa.; Secretary, Preston S. Millar, 29 W. 39th street, N. Y. City. Sections: New York: Secretary, Albert J. Marshall, 227 Fulton street. New England, Secretary, L. D. Gibbs 39 Boylston street, Boston, Mass. Philadelphia, Secretary, F. N. Morton, Broad and Arch streets Chicago, Secretary, T. R. Beebe, 157 Michigan avenue,

Indiana Gas Association.—Annual meeting, January 19, 1911, Fort Wayne, Ind. Officers: President, Carl H. Graf, Indianapolis; Vice-President, S. E. Mulholland; Secretary-Treasurer, Philmer Eves, Indianapolis Gas Company, Indianapolis, Ind.

Iowa District Gas Association.—Annual meeting, time, June 23, 24, 25, 1910, Sioux City, Ia. Officers: President, Geo. H. Waring, Omaha, Neb.; Secretary and Treasurer, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, time, ———— Wichita, Kas. Officers: President, W. A. Scothorn, Hutchinson, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

Michigan Gas Association—Annual meeting, time, September, 1910; ———— Officers: President, B. O. Tippy, Grand Rapids, Mich.; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April 14, 15 and 16, 1910; Jefferson City, Mo. Officers: President, W. A. Bixby; Secretary and Treasurer, C. L. Clary, Sikeston, Mo.

National Commercial Gas Association.—Annual meeting, December, 1910: Boston. Officers: President, E. N. Wrightington, Boston; Secretary, Louis Stotz, 36 West 39th street, New York City.

Natural Gas Association.—Annual meeting, May 17, 18 and 19, 1910; Oklahoma City, Okla. Officers: President, William H. McKenzie, Kansas Citr, Kas.; Secretary, T. C. Jones, Delaware, O. Editor Wrinkle Department, F. W. Stone, Ashtabula, O.

New England Gas Association.—Annual meeting, third Wednesday in February; Boston. Officers: President, W. H. Snow, Holyoke, Mass.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

Oklahoma Electric Light, Railway and Gas Association.—Annual meeting, May 18, 19 and 20, 1910; Oklahoma City. Officers: President, F. H. Tidman, Oklahoma City, Okla.; Secretary-Treasurer, Galen Crow, Guthrie, Okla.

Pacific Coast Gas Association.—Annual meeting, Sept. 20, 21 and 22, 1910, Los Angeles, Cal. Officers: President, W. B. Cline, Los Angeles, Cal.; Secretary-Treasurer, John A. Britton, 925 Franklin street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, April, 1911, Reading, Pa. Officers: President, J. H. Keppelman, Reading, Pa.; Secretary-Treasurer, William H. Merritt, Lebanon, Pa.

Society of Gas Lighting.—Annual meeting, December, 1910; monthly meeting, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 1123 Broadway, New York.

Southern Gas Association.—Annual meeting, Feb. 16, 1911, Montgomery, Ala. Officers: President, H. W. Frund, Salisbury, N. C.; Secretary-Treasurer, Jas. Ferrier, Rome, Ga.

Southwestern Electrical and Gas Association.—Annual meeting. ————, 1910, Beaumont, Tex. Officers: President, R. B. Stichter, Dallas, Tex.; Secretary's office, 300 Commerce street, Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May 11 and 12, 1910, Milwaukee, Wis. Officers: President, R. B. Brown, Milwaukee, Wis.; Secretary-Treasurer, H. H. Hyde, Racine, Wis.

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"The Only System in Successful Operation."

U. S. Patent No. 904043.
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388 Benches, with 3984 Retorts in operation and under construction.

TOTAL DAILY PRODUCING CAPACITY, 60,000,000 CUBIC FEET.

First Installation in the United States of America,

PROVIDENCE, R. I., 12 BENCHES, 120 RETORTS,

Complete, with

Retort House, Coal and Coke Handling Machinery and Storage Bins.

HORIZONTALS AND INCLINES OF APPROVED TYPES.

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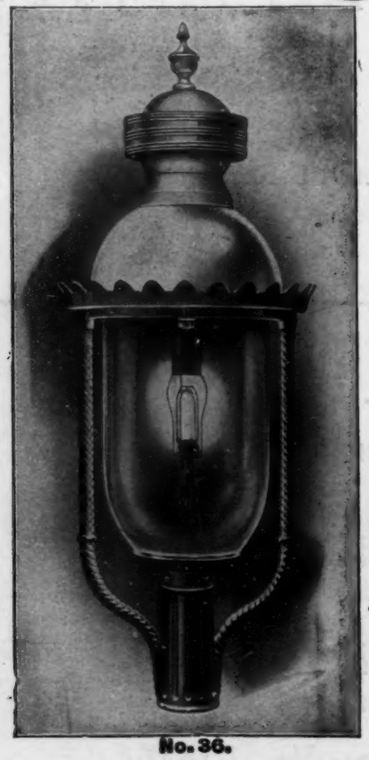
WELSBACH STREET LIGHTING COMPANY

OF AMERICA



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Controls and Operates the **Welsbach System of Street Lighting,**

Which includes its specially DESIGNED and PATENTED BURNER for PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

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IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

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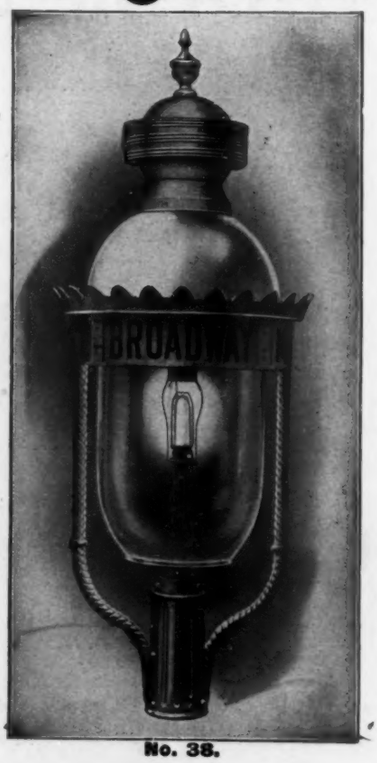

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Made Good in the Factory-- that's why it's made good outside!

Thoroughly tested by many gas companies--then bought --and recommended by them to other gas companies. Guaranteed wind, rain and bug proof. High candle power at normal gas consumption, and at decreased maintenance cost.

THE WELSBACH MULTI-FLEX ARC.

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Dark Green Enamel.	*White Enamel with Gold Bands.*
Each..... $25.00	Each..... $23.50

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Largest Builders of CARBURETTED WATER GAS PLANT IN AMERICA.

SOLE AMERICAN BUILDERS

OF THE

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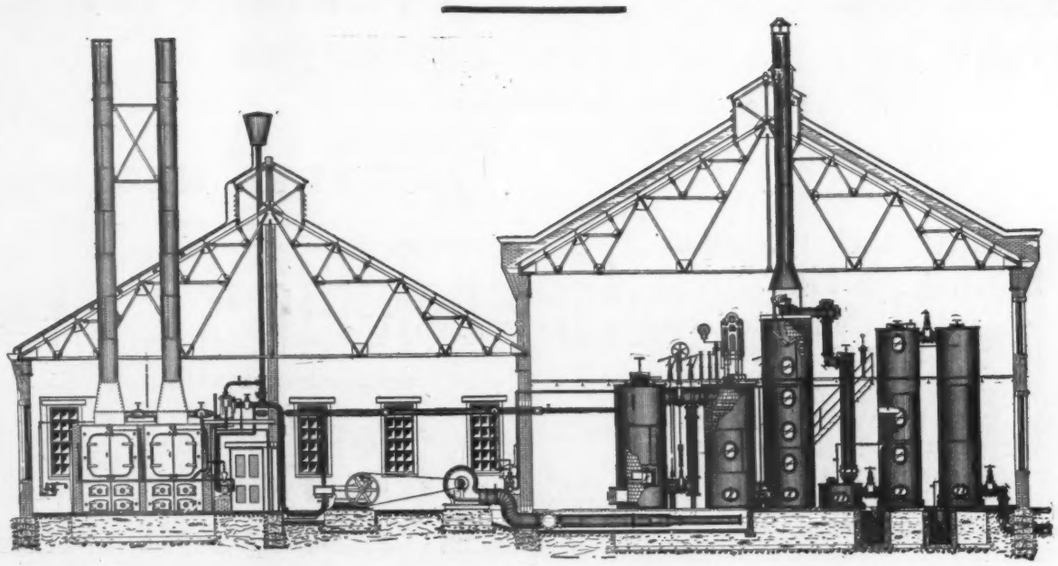

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Abilene, Tex.	Jersey City, N. J.	Rockville, Conn.	Auburn, N. Y.
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Middletown, Conn.	Burlington, Ia.	Sag Harbor, N. Y.	Moline, Ills.
Weatherford, Tex.	Des Moines, Ia.	Wilmington, Del.	Aurora, Ills.
New Bedford, Mass.	Pelham, N. Y.	Hammond, Ind.	Goldsboro, N. C.
Dallas, Tex.	Pleasantville, N. J.	Sumter, S. C.	Hoopeston, Ills.

TOTAL NUMBER OF SETS INSTALLED DURING YEAR 1909, ... 31
TOTAL NUMBER OF SETS INSTALLED TO JANUARY 1, 1910, ... 721
TOTAL DAILY CAPACITY TO JANUARY 1, 1910, ... 585,590,000 cu. ft.

Tar Extractors for Carburetted Water Gas
Photometrical Apparatus.
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Recording Gauges.
Straight Standpipe System for Coal Gas Retorts.
Straight Standpipe Cleaners.
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Ground Fire Clay, Fire Sand and Ground Fire Brick in Barrels and Bulk.

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GEROULD'S IMPROVED RETORT CEMENT.

A Cement of great value for patching retorts, putting on mouthpieces, making up all bench-work joints, lining blast furnaces and cupolas. This cement is mixed ready for use Economic and thorough in its work. Fully warranted to stick.

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In Kegs, 100 to 200 " " 6 " "
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KRATER-DINAS RETORT CEMENT.

Universally accepted to be the best cement for patching and repairing retorts, making up bench work, etc. Advantages: Powdered form; only mix with water; no waste; too much mixed, apply water and use the next time; adheres very easy; does *not* fall out by decarbonization. We guarantee or take back. Many re-orders and recommendations from America, Germany, France, Belgium, etc. Write for price and testimonials.

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**RETORT BENCHES OF EVERY DESCRIPTION,
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RETORT HOUSES,
CONVEYING MACHINERY.**

Fiddes-Aldridge One Stroke Stoking Machine.

Note Strength of Construction of Half-Depth Bench of Sixes.

We not only Design and Construct Benches, but Manufacture our own Retorts and other Fire Clay Materials, and are Independent of other Manufacturers.

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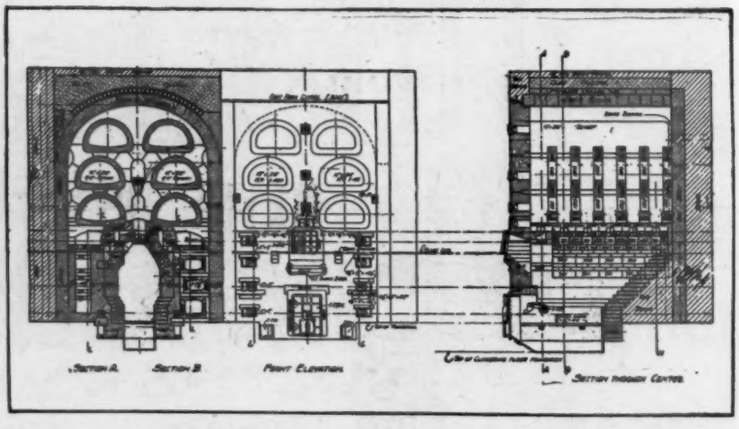

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Labor-Saving Machines for Handling Coal and Coke from Coal Cars to Coke Yard or Bins. Coke Screening and Measuring Plants a Specialty.

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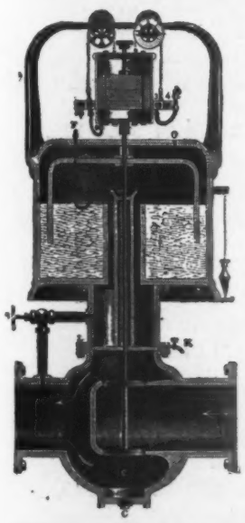

Automatic, Balance, High Pressure and Service Governors,

Unison Telemetric Pressure Gauge,

Iron Sponge, Purifying Material for Gas Purification, Manufacturers of Jones Jet Photometers, The National Smoke and Ammonia Helmet, Sulphur Testers, High and Low Pressure House Governors.

Wide Experience in High Pressure Installation and Extension.

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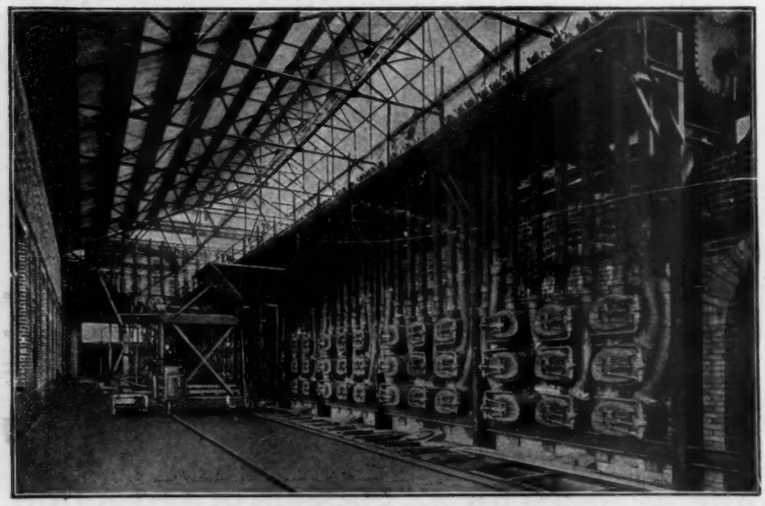

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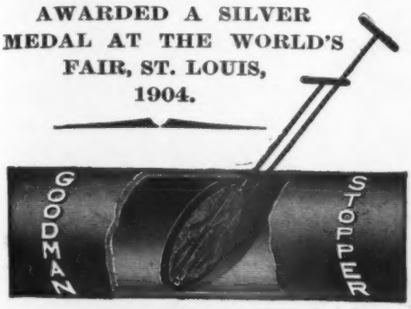

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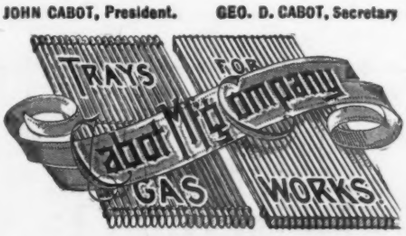

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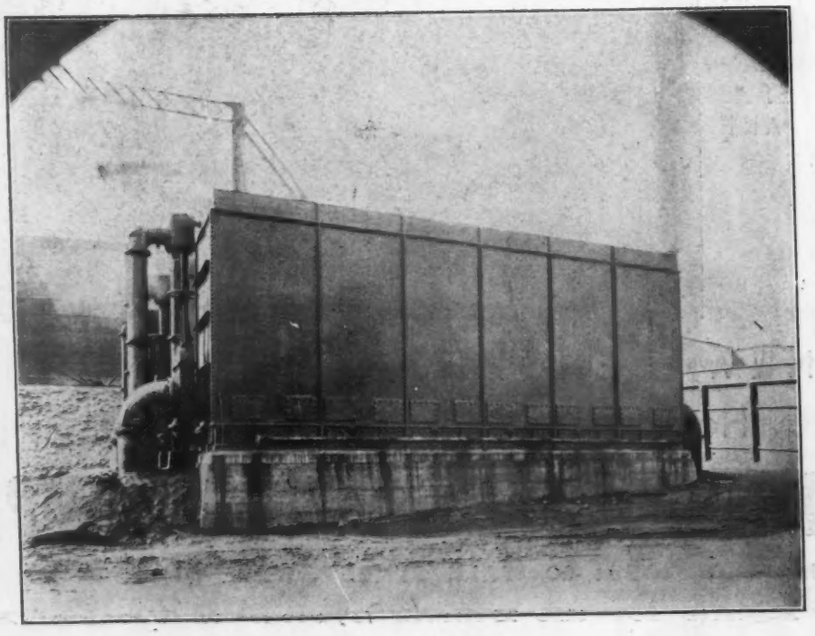

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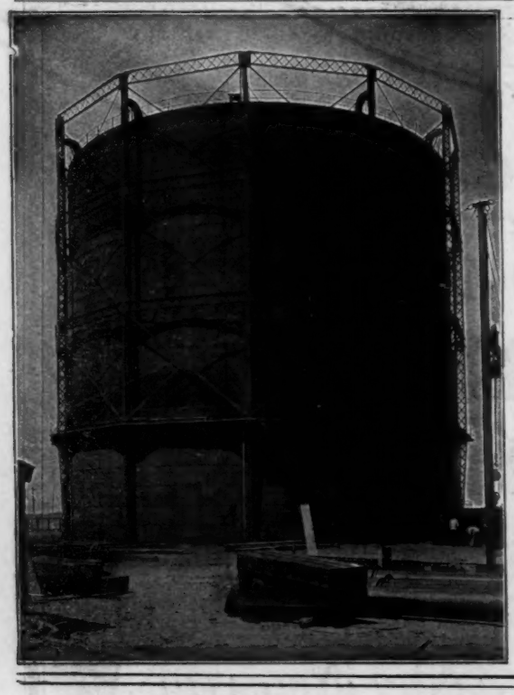

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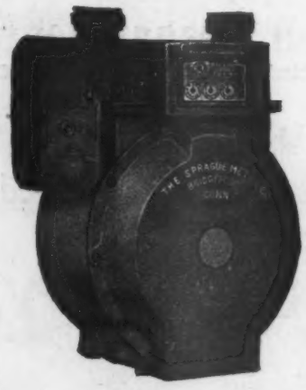

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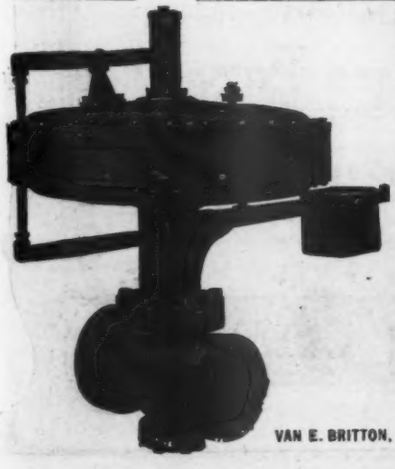

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